
MEDICAL REPOSITORY.

VOL. IV.—No. I.

ARTICLE I.

An ACCOUNT of a MALIGNANT DISEASE which appeared on board of the UNITED STATES FRIGATE GENERAL GREENE: In a Letter from Dr. L. KOLLOCK, of Savannah, in Georgia, to Dr. MILLER.

My DEAR SIR,

THOUGH I had very cheerfully undertaken to collect the materials for a short history of the fatal disease which occurred on board the United States Frigate General Greene, during her first and disastrous cruise, so unsuccessful were my inquiries, that I doubted whether the result would be sufficiently important to make up a communication.

It seemed a very favourable opportunity for ascertaining unquestionably, in one instance at least, the origin of a fever which, in its complexion and consequences, bore a strong resemblance to the terrible epidemics which have so severely scourged many of our cities and towns for several years past.

Unfortunately, however, no medical register or other journal was kept, from which a very accurate or particular account of the disease could be collected; and for the following sketch of a history I have been indebted to the cursory recollection of the officers, and the little I saw of the sick after the arrival of the vessel in port. Defective as it really is, I have determined to submit it to your inspection. Should you believe it so far calculated to aid the researches of others as to make it worth publication, or to afford the least gratification to yourself, I shall feel amply rewarded for the communication.

I am, dear Sir,

With great respect and esteem,
Your much obliged friend,
And humble servant,

L. KOLLOCK.

Savannah, Feb. 20, 1800.

Vol. IV. No. 1.

A

THE United States Frigate General Greene, under the command of Capt. Perry, sailed from Newport, Rhode-Island, on the 3d of June, 1799, for the Havannah. She had on board two hundred and fourteen men, all apparently in good health. The ship being new, we may suppose she was in a cleanly condition. She was also leaky. Having been caulked in winter, her seams opened as the warm weather advanced.

Her ballast consisted partly of iron and partly of earth, taken from a clay shore. This was intermixed with soft slate-stone, shells, and marine vegetables. Her provisions consisted of beef, pork, salt fish, rice, Indian meal, flour, and a small quantity of poultry. The liquors were water and rum, with a small quantity of brandy and wine, as hospital stores.

The ship was furnished with one ventilator, and wind sails; and, in this condition, put to sea, at the period above-mentioned.

After being six days out, they were overtaken by a severe gale of wind, which continued for several days. Her leakage was greatly increased by this incident, part of her provisions damaged, and even her magazine affected.

This storm was succeeded by very hot weather, and the extreme putrefaction of the salt fish. The air in the hold of the vessel was so contaminated as to extinguish lights immediately; and candles in the cock-pit were almost useless from the same cause. The fish was thrown overboard, the decks washed and scoured, the ventilator and wind sails put in operation, and every measure of purification adopted that their situation allowed.

Notwithstanding these precautions, disease invaded them.—On the 18th of the month, the first man was seized with the symptoms of highly inflammatory bilious fever—such as violent pains in the head and bones, suffusion of face and eyes, hardness and velocity of pulse, prostration of strength, great thirst, vomiting, and costiveness.

These symptoms yielded readily to bleeding and the usual evacuations, and the patient recovered in the course of eight or ten days. He was a midshipman, whose duty obliged him to frequent the hold. Four other cases occurred shortly after the first, in men similarly situated, with like symptoms, but more urgent—yielding, however, to similar management, and terminating favourably in a few days.

On the 4th of July they arrived off the Havannah, when the second lieutenant was attacked with the same kind of fever, but with symptoms much more serious and alarming than any

of the preceding cases. He became, at once, delirious, and vomited incessantly a darker coloured fluid. This case appeared so formidable, that they were induced to call in additional advice. Dr. Halliday (an eminent medical gentleman at the Havaannah) visited him. It was the concurrent opinion of this gentleman, the surgeon and mate, that this was a strongly marked case of *yellow fever*. The liberal use of mercury, in addition to the remedies exhibited in the former cases, recovered this patient in a few days also. Until this period, no suspicions had been excited, or apprehensions entertained, of the formidable nature of the disease; nor had they deemed it other than the necessary consequence of so sudden a change of climate as they had experienced.

The origin and cause of so serious a calamity as was now foreseen and dreaded, became the subject of immediate inquiry. They had had no communication with any vessel at sea; nor had they touched at any place in their passage, or even had intercourse with the town, or vessels in the harbour, till this period. Other vessels in port were no more than usually sickly, and the inhabitants of the island were remarkably healthy.

The principle of disease seemed to have been generated on board, and to have gradually acquired virulence and activity as they approached the place of their destination.

After this period, three, four, and five new cases occurred daily; and the violence of symptoms seemed to increase with the multiplication of cases, during the six days they lay in port.

No death had as yet occurred; and the vessel was now ordered to convoy a fleet of merchantmen to the United States; for which purpose they set sail on the 10th, with many sick, and the disease increasing.

On the 12th, the second day from sailing, the first man died, with vomiting and delirium to the last. He was attacked the 5th of the month (the next day after their arrival), and died on the seventh day of the disease. From this period, the uncontrollableness of the disease, and the frequency of deaths, excited such consternation and distress as to produce almost total neglect of dates, or particular circumstances of a disease, which raged, with unabated violence, till they arrived in the latitude of Virginia.

The surgeon and purser were the last who fell victims to this terrible disease. The latter died on the 22d. They were sick but two or three days, and, like the others, died with excessive delirium and black vomit.

After passing the Capes of Virginia, there was an obvious mitigation of symptoms, and the disease gradually became milder as they approached the port of Rhode-Island, which they reached on the 27th of July, after a passage of seventeen days; during which time they had experienced all the terror and despair which a situation hopeless as theirs seemed, is capable of inspiring.

They were unceasing in their exertions to purify the ship. Washing, scouring with vinegar, burning powder and vinegar, old junk and brimstone, added to constant ventilation, proved unequal even to the amelioration of their calamities, while they were in the latitude of great heat.

According to their computation, the whole number of the sick, from the time of their leaving port till their return, was forty—of which number twenty died, and all in the space of ten days. Most of the deaths happened in twenty-four hours from seizure, and all within five days, excepting two; one on the fifth, and the other so late as the seventh from the attack.

Those who frequented the hold, and were stationed in the neighbourhood of the pumps, suffered more especially during the continuance of the disease, as they had been the first attacked with it.

From the surgeon's mate I obtained the following sketch of the medical management of the sick.

In most instances they had recourse to bleeding and blistering, in the earliest stage of the disease, but without any perceptible benefit: it produced no mitigation of symptoms. The vesications dried immediately, and turned gangrenous. The blood was of a loose, dissolved texture. Every other remedy used seemed totally unavailing, excepting mercury. Large doses of calomel seemed to controul every symptom: and, where ptyalism could be produced, not a single patient died.

Shortly after the vessel came into port, the invalids of every description (say about forty) were landed at the hospital on Coaster's Harbour. Being requested by the Town Council of Newport to accompany the late much respected Dr. Senter in attending the hospital, we visited them as soon as they were landed.

We found but four or five cases of recent disease. The others were convalescents from fever and salivation. There was an uncommon number of ill-conditioned ulcerated legs, and some with venereal complaints.

The new cases of fever appeared of the bilious inflamma-

tory type, but had nothing formidable in aspect; nor was there but a single case where the symptoms were urgent. There was nothing uncontrollable by the most ordinary remedies, or any thing singular in the management or progress of disease, but the ease with which it was controlled, and the rapidity of recovery, in this pure air, and under new regimen. Even the sore legs almost immediately assumed a more healthy aspect.

After the removal of the sick, the ship was disburthened of her stores, ballast, &c. cleansed and white-washed throughout. Still new cases occurred on board for nearly two months. Some days two, three or four, were sent off to the hospital, which would seem to indicate the retention of some portion of this noxious principle, which was lodged beyond the reach of the cleansing process. Not one out of about a hundred who were sent to the hospital died.

From the apprehensions of the inhabitants that the disease was communicable, intercourse between the vessel and the hospital was as much barred as possible: still communication was not to be altogether avoided, and nurses, &c. were, from necessity, constantly with the sick. Clothing, &c. was carried from the ship to the hospital; and, in short, had it been contagious, the intercourse was sufficient, in all probability, to communicate it to some one; yet no one felt its influence.

ARTICLE II.

A BRIEF ACCOUNT of the SITUATION and DISEASES of CAMPEACHY-TOWN, on the Isthmus of DARIEN; shewing the Efficacy of Calcareous Earth (Carbonate of Lime), in overcoming the Exciting Cause of Fevers: From a Communication of Mr. RICHARD V. W. THORNE to Dr. MITCHILL, dated Campeachy, Jan. 16, 1799.

CAMPEACHY, a sea-port town of the Province of Yucatan, in New-Spain, North-America, is situated on the western coast of the bay of the same name, somewhere about 19 deg. 45 min. north lat. and 16 deg. 11 min. east long. from Philadelphia. It is a port of considerable trade, more especially in logwood, of which article immense quantities are shipped from it.

6. *Situation and Diseases of Campeachy-Town.*

Lime-stone abounds here, and in the country round; and large quantities of lime are exported from this place for the market of La Vera Cruz.—The soil, in the neighbourhood of the city, is chiefly of a sandy loam, appearing to be fertile, and well adapted for cultivation. The city, however, is itself built on a bed or rock of lime-stone, excepting a small portion of the south part. It extends from south-west to north-east, being in circumference about two miles; and is surrounded by a stone wall (the greater part of which is lime-stone), in height upwards of ten feet. Owing to this, as well as to the city's lying behind a considerable mountain, the atmosphere undergoes but little change from ventilation; and its inhabitants, who are estimated to be about ten thousand or upwards, suffer all the inconveniences of a sultry and confined air. The trade-winds, also, passing over the parched Province of Yucatan, lose, at least, all the salubrity and refreshing qualities on the way, if they do not imbibe others of a poisonous nature: for in the inner parts of the province are large plains of water, which they pass over, and which are, no doubt, stored with putrefying materials enough to engender no small portion of the pestilence that renders New-Spain unhealthy. The harbour of Campeachy is extensive, but shallow. The flats that run off, to the north and to the south, do not, at the distance of above twenty miles, exceed in depth two or three fathoms; and the tides here, rising and falling about two or three feet, necessarily leave bare an extensive tract of mud, fronting the city, exposed to the influence of a vertical sun.

The houses are large and airy, built principally of stone, a considerable part of which is of a calcareous nature. White-washing is used instead of paint.—The streets are wide and clean, and are paved by the rock on which the city stands, except the back part of it, where the rock does not extend. There the streets are very muddy and filthy, owing to the immense quantities of rain that fall not being able to run off, and forming stagnant ponds and mud-holes: but that part of the city under which lime-stone extends is clean, and the air smells sweet.

Fronting the large gates, which are opposite to the centre of the city, is a dock (or, as it is called, a mole), which runs from these gates into the water about one hundred yards. The vessels that come to this dock are about from ten to fifteen or twenty tons burthen. Great quantities of filth of every kind

are thrown off this dock. Large quantities of fish, also, that are brought here to market in small boats, and often spoil, add to the collection; so that, when the tide falls, it frequently leaves the mole nearly dry. This filth, then, with a considerable space of mud, is left exposed to the rays of the sun. After the sun has had its influence on the mud for some time, the stench that is emitted is intolerable, so much so, that a person who has not been used to it can with difficulty bear it.

Notwithstanding the large quantities of putrid matter that are exposed in the front of the city, and filth that collects in certain parts of the town, the inhabitants are very healthy; so much so, that it is an uncommon thing to hear of their being affected with the most trivial complaints. There is only one physician of note in this place, and his practice is so inconsiderable that he devotes much of his time to other business: he is even concerned in the French privateers which cruise from that port, which I take to be a lucrative connection.

The question naturally suggests itself, Why does not the yellow fever (as it is generally termed) rage here? La Vera Cruz, which is nearly in the same latitude, and but a few hundred miles from Campeachy, is sorely afflicted with endemic diseases. As to the disagreeable situations of the two places, they are nearly the same. The city of La Vera Cruz abounds in filth—Campeachy, on a general scale, does no less. The manner of living, among the inhabitants of the two places, is pretty much the same; dissipation being wanting on neither side. How, then, happens it that La Vera Cruz is so afflicted with diseases, whilst Campeachy is healthy? Campeachy abounds in lime-stone—La Vera Cruz has none, except the small quantities that are procured out of the keys, and that brought from other places. May it not, then, be owing to the powerful antiseptic quality which this lime possesses, neutralizing the acid of contagion whenever they come in contact; and, by this mean, rendering Campeachy healthy? The town of New-Providence, in the Bahamas, furnishes another striking proof of the good effects of lime-stone underlaying a city. I am warranted in saying, that this place is principally built on lime-stone; and, notwithstanding the filthiness of the place, the inhabitants enjoy good health.

From the information I have been able to collect, I find that lime-stone prevails more generally in these latitudes than almost any other stone; and, I believe, in greater quantities than in colder latitudes; from which it appears, that Provi-

dence has intended something more by them than the mere ordinary use of building, &c. and, at the same time that they are used for these purposes, they still shall possess that property of rendering the air that surrounds them sweet, and fit for respiration.

ARTICLE III.

OBSERVATIONS on the YELLOW FEVER. By Dr. FELIX PASCALIS, of Philadelphia.

To the Editors of the Medical Repository.

Philadelphia, Feb. 1, 1800.

GENTLEMEN,

IN two former letters, directed to Professor Mitchill, I had included observations, for the Medical Repository, on various topics relative to the yellow fever. I promised, likewise, to complete, in a subsequent letter, my yearly tribute to your publication. This I am now happy to present to you, with new arguments on what I call the *sedative power* of those septic or deleterious gases which breed malignant and pestilential fevers. I subjoin, also, a little controversy on the method of salivating patients in that disease, and on the nature of the contagious power which may be attributed to it.

Sect. 1. When I first suspected that no specific poison was received in the body, to produce the yellow or any other malignant fever, and that the only *negative effect*, but the most terrible, of septic gases, was that of destroying animal *irritability*, I ought to have explained what is meant by that *sedative power*, in opposition to those modern systems which entirely explode the very meaning of any sedative operation in animal life. I should also have pointed out, by analogy, that there are cases of diseases, in which similar symptoms to those of pestilential fevers are induced by gases internally formed.— Lastly, if any serious objection against the truth of such doctrine could be apprehended, it must be immediately discussed and answered.

1. If medical science had not been distracted by too many systems, it would not be necessary incessantly to explain the words we are obliged to make use of, in any progressive view of the phenomena of life. In more than one instance, indeed, truth remains involved in doubts, or must be absolutely rejected, by the sole effect on the mind of *unexplained* words, which become the signals of party systems.—“There is no such thing as a sedative in nature,” say the Brunonians; because, when excitability is diminished, in inverse ratio excitement is accumulated; and if either excitement or excitability were ever conceived to cease, death would be the necessary consequence: therefore, a *sedative* operation on the living body implies contradiction; for if it diminishes excitability, it increases excitement—or, if it destroys it, it causes death!

We smile at such reasonings, because they appear, in medical sciences, like the *modes* and abstracts of entities (*chimeræ bombilantes in vacuo*) which constitute the philosophy of the Peripatetics.—We can conceive what are the exciting powers and excitement of the Brunonians, although they imply a confused compound of causes and effects; but we do not know what is meant by their *excitability*. Dr. Brown himself declares, “*that such slippery questions must be carefully avoided, as being incomprehensible, and as having proved a venomous snake to philosophy:*” § xvii. ch 3. yet it is on such a ground that an immense theory of human diseases has been laid; and it is from such doctrine that institutes of medicine are held, taught, and adopted, as modern improvements!!!

But let us admit the theory in its genuine meaning; then *excitability* must be said to be a certain energy or faculty, through which the whole *organized* system is to be affected by *exciting powers*: it is, therefore, a certain quality or attribute of living matter; and, in other words, excitability must be the result of *organization*.*

Let us go farther.—What is meant by *excitement*? This is the operation of all the *exciting powers* on life, on senses,

* As the functions, in every instance, depend on the mechanism or structure of the organs (for they are invariably affected by every cause that affects this), it is a necessary consequence, that life is not a principle super-added to organization, but the effect of it: therefore we may safely regard the terms life, vitality, vital principle, living principle, excitability, as synonymous, and expressing a condition of the organs only.

[John Aitkin's Principles of Anat. and Physiol. vol. ii. p. 119.]

The same doctrine has been recently more fully explained, in the book of Dr. Onydyd, on the Different Causes of Death.

and on each organ; so that *life* begins with an exciting power which produces it—*senses* continue to be acted upon by various exciting powers for the support of life—and *organs* are various mechanical results of the phenomenon of life, produced and supported by exciting powers. In few words, consequently, we must conclude, that *exciting powers*, or excitement, constitute *organization*, and that *excitability* is the attribute of *organization*.

We begin now to understand, that between excitement and excitability there is an intermediate state, which is the effect of one and the cause of the other; and we may safely suspect that there cannot be such immediate correspondence between excitement and excitability, that the rise of the one should necessarily constitute the fall of the other, and *vice versa*.

Indeed, although exciting powers produce and support life, they may have an innumerable series of degrees in their action, to constitute good or bad *organization*; and when bodies exist with their strength and *organical* perfection, or with their weakness and malconformations, it remains impossible further to lay down any rule of proportion between the excitement and *organized* life. While we might, in fact, describe the former within certain accurate bounds, the latter (that is to say, organization) remains various, *ad infinitum*, even among healthy people, who enjoy different sorts of constitution, and whose faculties, either of the body or of the mind, are never of the same degree of perfection: yet every one of them has his own excitability, or *irritability*, which is the necessary attribute of organization; but instead of being in exact correspondence with excitement, or exciting powers, that excitability will more certainly receive its vigour or weakness from the animated matter, or from organization, of which it is a mere quality. Now, the latter, in its perfect or in its disturbed state, offers to us another most strange phenomenon, which further removes the possibility of reducing the knowledge of excitability into tables and degrees: it is, that when it appears shattered and almost destroyed, excitability is often the more accumulated, and *vice versa*.

The theory which explains life and diseases by the action of *exciting powers*, in certain and due proportion, and of the excitability in its accumulated or impaired state, is therefore false in its foundation. Organization is intermediate between excitement and excitability, which prevents them from being in direct correspondence; and it cannot be said that the loss or accumulation of the one has any effect on

the other, unless organization has been affected; and the alteration of this is as much surprizing and incalculable, in the terrible effect of a luxation of the head on the vertebral column, as it seems unalterable in cases of the greatest perturbations, loss of substances and lesions of viscera.

I have been led, gentlemen, to this explanation, to prove how gratuitous is the assertion of the Brunonians, and others who explode the idea of any *sedative operation* in human life, because it was for them necessary, on the ground of consistency, to reject it, on account of the mechanical correspondence they have established between excitement and excitability, so that the rise of the one is always the depression and abatement of the other, and *vice versa*.

This *excitability*, which, by analogy with the most ancient and approved doctrines, I will designate by the name of *irritability*, is the very attribute of organized matter, which experience demonstrates to be liable to a kind of depression, or *sedative operation*. What constitutes that irritability? Is it a heat which may be absorbed? an insensible motion which has been diminished? a porosity that could be contracted? Is it a situation or arrangement of parts exposed to be inverted? Is it a collection of inhaled organs incessantly to be kept in activity? These *hypotheses* I do not pretend to fix and determine; but the probability of the existence of any of them shews that irritability may be increased by external and internal causes, as well as it may be fatally depressed and destroyed; and this result has been proved by philosophical experiments, as I mentioned in my last letter. Certain gases are now thought, by all chemists, to be destructive of life, and deleterious to all living bodies. That they are so, by destroying animal irritability, I will never take much trouble to prove *a priori*,* since the learned are in possession of

* The doctrine of the French chemists, on the operation of deleterious gases on animated matter, is known; and, by their experiments, Fourcroy and Spallanzani leave some authority for the belief of their *sedative effects*. Dr. Onydyd, whom I have already mentioned, takes some trouble to prove that they operate by their *stimulating powers*; but to me his arguments appear very inconclusive. Among the modern medical theorists it is pretty much customary to term *stimulus*, or *stimulating power*, any kind of operation or impression received by living bodies. They tell us, it is true, that various and many *stimuli* differ only in degrees. Dr. Brown had first introduced that mode of reasoning, when he said that cold was nothing but an inferior degree of heat, as *caloric* could never be perfectly exhausted; and so he went on to class heat and cold among his *stimulating powers*! When questions of this kind rest merely on the ingenuity of their supporters, it is better to refrain from discussion, and continue to believe that opposite causes

so many striking proofs of such phenomena. I only add, that when the great attribute of living matter is no more, or when it is much impaired, fluids will no more circulate, and will be instantly subject to putrid fermentation, which constitutes all malignant and pestilential fevers.—I will now prove the same result, by analogy with diseases produced by a similar loss of animal irritability.

2. To point out some of the sedative effects of deleterious gases on animal irritability, I need but to mention intermitting fevers, which, in all their various shapes, uniformly present the following facts:—1. They are endemic in low and marshy grounds, at any time of the year, in warm climates—and, at least, during the fall in others; that is to say, when and where the soil is thickly covered with vegetable substances reduced to putrefaction. 2. In those fevers no specific poison or contagious matter has ever appeared to constitute their cause, nor to be the means of their prevalence. 3. In their periodical paroxysms no other diagnosis can be formed, but that of the periodical return of a certain degree of debility, which is equal to an exhausted animal irritability. 4. Making due exceptions of such cases of intermitting fever in which the constitution has been impaired, and chronic affections formed, by their repeated exacerbations, we see that they generally yield to the removal from the place where they prevail, to the succession of seasons, or to the internal use of powerful tonics and active stimulants.—If, now, we resume all these true and well ascertained characters, uniformly belonging to all the endemic intermitting fevers, do we not clearly perceive in them all the proofs of the formation of deleterious effluvia—of their action on the system by inducing debility, or operating sedatively, until irritability can be restored to its proper standard, by natural or by artificial means? It would be here very interesting to discuss, how animated fibrous matter, and all the organized fabric of living bodies, is *convulsed*, as soon as irritability is impaired, and, no doubt, we would easily prove that a febrile exacerbation is nothing but the re-action produced on blood vessels by the convulsive

should always produce opposite effects; such are heat and cold, light and darkness, motion and rest, &c. We, therefore, can safely conclude, that as there are certain principles or substances necessary or favourable to the action of life, there are others unfit, inimical and contrary to it. Their sudden and fatal operation is a proof, that, instead of stimulating, they are absolute *destroyers* of all the powers of life, and these we call *sedatives*.

state of the fibrous matter: * therefore, remedies which, by a stimulating power, may restore animal irritability, will, of course, put an end to the convulsive action, and prove the cure of intermitting fevers. This explains those surprising, and often unexpected cures of such diseases, obtained by strange applications, while they baffled medical skill. The variety of constitutions authorizes us to believe, that every one is not equally acted upon by the same known remedies, and that, among these, there are but few to be depended on as true restorers of animal irritability.

The tribe of malignant fevers offers none that cannot be traced to the action of deleterious gases. Thus we class those fevers under the names of camp, jail, hospital, and ship fevers, besides those which are particularly described as pestilential. Each of them, in fact, is known to originate from corrupt and dangerous effluvia, unfit for respiration and life, and destructive of animal irritability. Such effects, which we are obliged to ascribe to *external* causes, must consequently be attended to, when they are produced by *internal* ones: for let us admit that a sufficient quantity of putrescible matter is caused to ferment in the body, and it will, of course, emit deleterious gases, destroy animal irritability, and constitute a malignant or pestilential fever. This assertion I may prove, gentlemen, by comparing with the yellow fever the child-bed fever, that astonishing disease, which, without any specific contagion, has been observed to rage like an epidemic in the two principal towns of Europe.

The child-bed fever, called by the French *prima mensis*, had been anciently known, but variously understood. Its epidemic prevalence, in the Westminster Lying-in Hospital, in the year 1769, and in the Hotel-Dieu of Paris, at different periods, but chiefly in the year 1774, called all the attention of eminent physicians, of the French and English faculties, to ascertain the nature and the treatment of that formidable scourge. It will be proper to recollect here some of the observations written on that subject by Dr. Leak, physician to the Westminster Lying-in Hospital, and contained in the report

* Convulsion or contraction of muscular fibres is nearly the same; and when they take place, it is evident that *irritability* is lost or impaired. Living fibres contract as soon as they are divided or *disorganized*. In convulsive paroxysms there is consequently a struggle between parts contracted and parts violently re-acting by these unnatural actions: fluids are immediately deprived of a free and easy circulation; they are carried tumultuously in some vessels, *in inverse ratio* of the contraction of other parts. This disordered state, I believe, constitutes fever.

ordered by and read before the faculty of medicine of Paris, sitting in the Louvre, 6th September, 1782. It appears that, in the first outset of the disease, the symptoms are absolutely like those of the yellow fever—such as a violent inflammatory diathesis of the blood, prodigious vomitings of bile, great pains in the loins and limbs, and stupefaction of mental faculties. Soon after a prostration takes place—the tongue becomes thickly crusted, and of a black, brown, or yellow colour—and the pulse sinks in a great depression. It is, however, more peculiar to the child-bed fever, that its last stage is marked by a foetid, black, and colliquative diarrhoea, which terminates it fatally; whilst, in the yellow fever, this symptom, which is frequently observed, is oftener replaced by the black vomiting. Dr. Leak mentions several cases of jaundice; and we must be satisfied, that in this disease, as well as in the yellow fever, the skin is covered, in many instances, with purple and black spots. In point of malignancy, and the ravages of gangrene in the alimentary canal, dissection has offered the greatest similarity between this and yellow fever. The only difference in the former is, that a considerable effusion of corrupted milk, resembling whey, is effected in the pelvis, and that the omentum is mostly suppurated: but the uterus, in the child-bed fever, is universally found in a sound state. From this circumstance it has been justly inferred, in London as well as in Paris, that in no case whatever could this disorder be ascribed to parturition. When it prevailed, no other description of people but women, four, five, and eight days after delivery, were subject to this, nor to any kind of fever. Thus it was impossible to trace the child-bed fever to any specific contagion, or to any external source of deleterious gases. Its violence in the Hotel Dieu of Paris, where so many unfortunate or abandoned women are obliged to resort, had so long baffled the humane and vigilant assistance of eminent physicians, that any effectual mode of cure was entirely despaired of, when Dr. Doulcet, of the faculty of Paris, happily found out, that a dose of fifteen grains of ipecacuanha, administered every day, proved a real and powerful specific remedy: all patients recovered. Dr. Leak himself tried and approved the remedy. It was consequently evident, that a stimulating operation being kept up in the alimentary viscera, an artificial irritability, as it were, was happily effected, to counteract any sedative impression whatever which might destroy it. But, it may be asked, was there any particular focus of putrefaction in the intestines, in the uterus, or in the lacteal

vessels? If so, what did determine it? for such a disorder very seldom occurs in private practice. For my part, gentlemen, I conceive, that a very obvious cause in lying-in hospitals will induce debility, and, with it, expose to putrefaction all fluids in the maternal bowels. This is a moral cause: it is the painful situation of young mothers, who have the disgrace of being in a lying-in hospital, objects of medical observation to some, of contempt to others, of charity to all. However profligate they have been, or strangers to the delicacy of their sex, can they remain unfeeling creatures in the bed of sorrow, where they become mothers, and are to lose immediately all the sweets of that state, even the knowledge and possession of their innocent and unfortunate offspring? I ask the philosopher and physiologist, whether they can conceive a more powerful moral cause acting as a sedative on animal irritability, and diffusing in the system the deadly torpor which constitutes a malignant fever? It amounts to the same deplorable effects, whether animal irritability is overcome, in one disease, by the sorrowful state of the mind, or by floating deleterious gases, in others, as in the yellow fever.

3. There is, I believe but one objection to this hypothesis which requires to be discussed: this is, that nobody would be exposed to the dangerous effects of septic gases, unless they were actually immersed in, or exposed to, a contaminated atmosphere; and that, consequently, no case of yellow fever should occur among persons who remove themselves from the seat of the epidemic, after a certain period of time. Yet many such cases have occurred. They have been so remarkable, that they have caused many physicians to adopt the opinion of a specific contagion being possibly retained after a certain space of time. Here we must previously observe, that if a few sporadic cases, in any part of the country, were to be traced to a specific contagion, we might as well ask why there are so few of those cases, and why all the fugitives who had been immersed in the contaminated atmosphere are not infected with it? for it is a well known fact, that the inhabitants successively desert the place, after the epidemic has proved its prevalence by a great number of victims: therefore they were all once exposed to that floating contagion which is thought to be so powerful as to remain unaltered during a long space of time. It cannot be conceived that few only would receive it. The greater number, on the contrary, who were witnesses of so many deaths within our city, although fugitives, would carry with them

the fatal and indelible poison. This is not the case. We are happy to know that there is at least safety in desertion. We do not see, therefore, any conclusive argument in the alleged facts of a few people being taken with the yellow fever, sometimes shortly after their removal from the seat of the epidemic. From these we only derive new proofs, that, during the heat of the summer, there may be local sources of putrefaction in many parts of the country, emitting and diffusing streams of deleterious gases, which, eventually, may be fatal to one or a few individuals. It is also more than probable, that, in the general revolution of the atmosphere, currents of septic gases may flow, without mixture or alteration, from one space into a distant one.

Admitting, however, what is probably true, that an attack of yellow fever may take place in a few or many days after having been exposed to the deleterious atmosphere, it would by no means destroy the truth of the aforesaid theory of the sedative effects of those gases on animal irritability. That attribute of living matter, we have sufficiently shewn, is the direct result of organization; and, however impaired it may be, it must take some time before the ultimate results of its alteration produce convulsion or fever, corruption of fluids, or malignant fever. When irritability is lost by the effect of a paralytic stroke in a limb, or in other parts, we see that it requires some time before it is restored, even after the cause of palsy is removed; for irritability is progressive as well as organization, which is its immediate cause. For the same reason, when a sedative power destroys irritability, there must be a certain period of time before its alteration has materially injured the laws of animal life. We do not know what can be that necessary period of time. It probably runs according to the intensity of the impure gaseous, and of the constitution of individuals. Some facts, however, seem to prove, at least, that there must be a certain interval of time between the action of the air and the breaking out of the yellow fever. During the late epidemic, we observed, that the greater the heat was after rain, the greater was the number of the sick, but progressively, during ten or fifteen days. We observed, likewise, that some days previous to an attack of the fever, many people will complain of head-ach and disordered bowels; others will have convulsions, &c. Finally, we know, that at the close of the season, and even one or two months after frost has begun to appear, when very little effluvium can be exhaled, a number of genuine cases of yel-

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low fever will occur; and these have been ascertained, in December, 1798, and in January, 1800, in the city of Philadelphia. These collected facts, gentlemen, give the best presumptive proof, that a period of time must somehow precede the attack of a malignant fever, after the impression received from septic gasses; and this must be the reason why few of our exiled fellow citizens have been its victims, after they had removed from the seat of the epidemic.

(*To be continued.*)

Erratum.

In Dr. Pascalis' former essay on yellow fever, vol. iii. p. 349, line 38; for "rapid circulation," read *depressed circulation.*

ARTICLE IV.

EXPERIMENTS on the PRODUCTION of AIR by the FREEZING of WATER.

By JOSEPH PRIESTLEY, LL. D. F. R. S. &c. &c.

IN 1793, when I was in England, I published a course of experiments on the *generation of air from water*; and, after my arrival in this country, I resumed the experiments, and published a *sequel* to them. The result of the whole was, that, after all air had been extracted from any quantity of water, either by heating, or by taking off the pressure of the atmosphere, whenever any portion of it was converted into vapour, a bubble of permanent air was formed, and this was always phlogisticated. The process with the Torricellian vacuum I continued some years, and found the production of air equable to the last. The necessary inference from this experiment is, either that water is convertible into phlogisticated air, or that it contains more of this air intimately combined with it than can be extracted by these processes in any reasonable time.

Finding that no air is contained in *ice* that is free from visible bubbles, I thought to ascertain the truth of one or other of these hypotheses, by exposing to frost a quantity of water,

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from which I had, by repeated processes with the Torricellian vacuum, expelled all the air that I possibly could, thinking that, if it really contained no air, it would appear by the ice being perfectly solid; so that, when it was melted, no air could be got from it. This experiment I repeated several times, but always found that the outside of this ice was perfectly transparent, and free from air. The central parts were opaque; and though there were no distinct air-bubbles in it, yet, when it was melted, a great number of bubbles issued from it. The whole quantity, however, was not greater than might have been procured from the same water, in the other processes, in a reasonable time: wherever ice was thawed the production of air had no limit.

Disappointed in my expectations of getting, by this means, ice perfectly free from air (which, when a large quantity of water freezes very slowly, it is easy to do, the air contained in it retiring from that which is frozen to that which remains fluid), I dissolved ice that was perfectly transparent, and, therefore, free from air, in vessels containing mercury, and exposed it to frost a second time: but I always found, that when the whole of it was frozen, though the extreme parts were transparent, and, therefore, free from air, the central parts were opaque, and, when dissolved, yielded air. And though I repeated this process ten or a dozen times with the same water, always letting out the air that was procured by freezing presently after it was extricated, and before it could have been re-absorbed, I never failed to get more air; and the harder the frost was, the more air I procured.

As there is an evaporation from ice, no less than from water, the interstices formed by the crystallization of the water, when it is converted into ice, will soon be filled with *vapour*; and this vapour, like that which is formed by heat, becomes, I suppose, the basis of a quantity of air. Since, however, ice that is the most transparent swims in water, this also must have interstices; but they contain no air, being such as always exist in the most solid bodies, in which (gold itself not excepted) the component particles are not in perfect contact; since they are reduced into less dimensions by cold.

As the vessels I made use of in these experiments were either cylindrical jars or conical wine-glasses, and, consequently, the bubbles of air produced by freezing were exposed to a considerable surface of water, and would, in time (though I found not in the course of a day) have been absorbed by the water, now free from air, I procured glass vessels of a conical form,

terminating in narrow tubes, into which the air dislodged from the ice might ascend, and not be subject to be absorbed. I was so fortunate as to have several of such vessels, and they completely answered my purpose for five or six processes. These vessels were first filled with mercury, and then I introduced into them a quantity of water freed from air by previous freezing; and when, after exposure to frost, the ice was melted, the air dislodged from the ice ascended into the narrow tubes, and remained, without any sensible diminution of bulk, several days; and every time that the water was exposed to frost, an addition was made to it. At length, however, though the vessels were very strong, and contained much mercury, which, by its tendency to descend, would give the water room to expand with the less danger of breaking the vessel, none of them served for more than the number of processes above-mentioned.

After the breaking of my glass vessels, I got other cylindrical ones made of iron, seven or eight inches in height, and near three inches wide at the bottom, the upper orifice closed with a cork and cement, in the centre of which was a glass tube, the diameter of which was about a fifth of an inch. And, as the glass tube was in the greatest danger of breaking by the freezing of the water, and this had happened several times before, notwithstanding all my care to guard it from the frost, I now made use of snow and salt, to freeze the water in the iron vessel only, placed in a vessel of mercury, having been previously filled as the glass vessels had been.

The water on which I now operated was about three ounces, and it had been made as free as possible from air by previous freezing. With this apparatus I repeated the process of freezing nine times, without changing the water, and the last portion of air that I procured in this manner was as great as in any of the preceding; so that there remained no reasonable doubt, but that air might be produced from the same water, in this manner, *ad libitum*; and having got near two inches of air in the glass tube, I put an end to the experiment; and, examining the air, found it to be wholly phlogisticated, not being affected by nitrous air, and having nothing inflammable in it.

During the process of freezing, the air in the tube was generally compressed into about one fifth of its usual bulk; but when I began to thaw the ice, which I did by means of hot water in the place of the freezing mixture, it soon expanded to its former dimensions, and no sensible portion of it was absorbed.

during the whole process, which was about a week. Sometimes the violence of the pressure, occasioned by the expansion of the water in freezing, would force a little water out of the vessel, between the cork and the glass tube, or the iron vessel, which presently became ice. This I always carefully removed, and applied fresh cement to the place, to prevent the introduction of any air from without, before I began to melt the ice. And that no external air had entered was evident, both from the manner in which the air was produced as the water recovered its fluidity, and from the quality of it, when examined, after the process.

In the course of the experiments with the glass vessels, a phenomenon occurred that was wholly unexpected by me, and which was very amusing. Having left the vessels filled, partly with water and partly with mercury, in the evening, I generally found them, in the morning, seemingly quite full of mercury, every part of the ice within the vessel being covered with it. This must have been occasioned by a vacuum having been formed between the glass and the ice, and into this the mercury had been drawn up on the principle of the capillary tube. When this was not the case, the interstices of the ice, towards the centre, were filled with thin laminae of mercury, which also exhibited a curious appearance.

Sometimes, when there was no mercury between the glass and the ice, an interstice was made between them when they were placed within the influence of the fire. In these circumstances I have seen the mercury drawn up to the height of several inches. As this space was enlarged by the increase of the heat, the laminae of mercury were contracted, till, coming into the form of balls, too heavy to be supported, they fell down to the mass of mercury in the basin.

The most natural inference from these experiments is, that *water*, when reduced, by any means, to the state of *vapour*, is, in part, converted into phlogisticated air; and that this is one of the methods, provided by nature, for keeping up the equilibrium of this constituent part of the atmosphere, as the influence of *light on growing vegetables* is the means of recruiting the other part of it; and both of them are subject to absorption and diminution in several natural processes. Inflammable air I have also shown to be convertible into phlogisticated air; and this is another means of supplying the atmosphere with this ingredient in its composition.

That water contains phlogiston I have shown to be probable, from several considerations, especially that of its re-

sembling metals in their property of being conductors of electricity; for these substances certainly contain phlogiston, if there be any such thing. Mercury also becomes super-phlogisticated by agitation in water, and this without limit, and without changing either the water or the mercury; and the remaining water contains no more oxygen than before; for the air expelled from it is not more pure, and it is perfectly free from acidity.

I will further observe, that those experiments, which prove the conversion of water into phlogisticated air, are inconsistent with the modern antiphlogistic theory, which makes water resolvable into dephlogisticated and inflammable air; but that they are highly favourable to the hypothesis of water being the basis of every kind of air, the difference between them depending upon the addition of some principles which we are not able to ascertain by weight.

ARTICLE V.

*An ACCOUNT of a HEBREW MANUSCRIPT COPY of the
JEWISH SCRIPTURES, now in New-York: In a Letter
from Mr. SOLOMON SIMSON, the Proprietor, to Dr.
MITCHILL, dated March 26, 1800.*

SIR,

THE old Manuscript Bible in my possession, of which you have desired some information, was brought from Turkey to England, by a gentleman who left his library to a relation of his in this country, and from the latter my aged father purchased it, with some other books. It is written in a character something resembling Rosha, or rather, it is to be presumed that Rosha borrowed or copied his from it. It is very different from the square character we have in use, and is about the size of a large octavo, written in two columns, on parchment, or vellum, as fine as silk. The songs of Moses, Deborah, and David, are poetical, written with the greatest uniformity and neatness, with black, shining ink. It is also accompanied with marginal notes, written so fine and small that

it requires good eyes, or glasses, to distinguish them. The Psalms appear to be a most masterly performance, and the diversity of the measure seems pleasingly to strike the eye, even of those who are unacquainted with the language, and is supposed to be the original poetry in which they were written by David, &c. There appears a great play of words and letters —some of the Psalms beginning with the alphabet, and in order going through the same, with many variations. The 119th Psalm is written in two columns, of four lines each, each eight verses beginning with the *aleph*, the next eight with the *beth*, and proceeding through the alphabet in that order, which is probably the reason of its being marked, in our English Bible, with *aleph*, *beth*, &c.

The two first chapters, and part of the last, in the book of Job, are written in prose, in two columns. The other part of the book is in short Hemistich verse, beautifully written, and the whole handsomely pointed. The accents appear to be the same as in our printed books, except the ten commandments, which are only with single accents.

In Joshua, chap. xxi. between the verses 35 and 36, two verses are inserted, with the names of four cities of refuge, of the tribe of Reuben. &c. which are not in our Hebrew or English Bibles: and Everardo Van der Hooght, in his edition, printed in Amsterdam, in 1705, mentions, in his preface, that these two verses are only to be found in three old, corrected munuscript books—but which he supposes to be an error.—The order of the books in the manuscript is as follows:

The Law, in five books.

Joshua, Judges, and Samuel, each in one.

Kings in one, without any division.

Isaiah, Jeremiah, Ezekiel, Hosea, Joel, Amos, Obadiah, Jonah, Micah, Nahum, Habakkuk, Zephaniah, Haggai, Zechariah, Malachi, Ruth, Psalms, Job, Proverbs, Ecclesiastes, Song of Songs, Lamentations, Daniel, Ezra, Nehemiah, Esther, and Chronicles, each in one.

The late Myles Cooper, LL. D. President of King's College, delivered my father, Joseph Simson, the following letter, with the book therein mentioned.

“ SIR,

“ I have been informed by Dr. Cooper, that you benevolently intend to lend me your curious Hebrew M. S. and when you have so done, I shall celebrate, in the most grateful man-

ner, your public spirit and generosity. I will take the utmost care of it, and it shall be returned, in twelve months, to the person in London you appoint to receive it; and for this I will give a note of hand, or (if you require it) a bond of obligation.—You will receive of Dr. Cooper the present of a book of mine, in which I have published your kind intention; and I hope you will accept that book as a mark of the gratitude of, Sir,

“ Your highly obliged, and

“ Very obedient servant,

“ B. KENNICOTT.

“ Oxford, March 4, 1770.”

In May following my father received the following note:

“ Mr. Cooper’s compliments to Mr. Simson, returns him Dr. Kennicott’s letter, which he did not send for yesterday, but only for his own, and hopes that Mr. Simson’s determination on the point in question, viz. the transmission of the M. S. to England, is favourable to the grand scheme of collation, which the learned gentleman has now in hand.

“ King’s College, May 8, 1770.”

The June following the manuscript was delivered to Dr. Cooper, with the following letter:

“ SIR,

“ In obedience to my father’s commands, which gives me particular pleasure, I now answer your esteemed letter, by the hands of Mr. President Cooper; and though the M. S. is highly valued, it is cheerfully lent to promote the great work you have undertaken. The President has engaged to return it safe in one year. Permit me to mention, that in the book you have favoured my father with, instead of his name (Joseph), mine has been inserted, which, no doubt, will be rectified. My good father commands his respects and best wishes with mine: that you may be blest with health to go through the arduous work you have in hand—that it may be completed with the strictest regard to truth, to your honour, and the good of mankind.

“ I am, with all due respect,

“ Reverend Sir,

“ Your most obedient, humble servant,

“ SAMPSON SIMSON.

“ Rev. B. KENNICOTT.”

In 1772, Dr. Cooper returned the M. S. with the following letter:

“SIR,

“I beg you to accept of my best thanks for the use of your valuable Hebrew M. S. which I am very glad of returning to you so safely as by the hands of Dr. Cooper. I shall take care publicly to express my gratitude* for this act of your kindness.

“And am, Sir,

“Your highly obliged, and

“Obedient servant,

“B. KENNICOTT.

“Oxford, May 11, 1772.”

There does not appear any certainty when this Hebrew M. S. was written. Gentlemen, learned in the Hebrew language, have differed greatly in their opinion—from 700 to 1700 years ago. Some have gone so far as to suppose it to have been written by Ezra the scribe: but all agree that it is a valuable as well as a very ancient manuscript.

I am, Sir,

With due respect,

Your most humble servant,

SOLOMON SIMSON.

* Mr. Simson's manuscript is mentioned in the second volume of Kennicott's Bible in folio, of which there is a copy in the library of Columbia College. In the catalogue of the seven hundred which he consulted, this is the 144th, and is distinguished by the words, “AMERIC. NEO-EBOR.” It is conjectured, by him, to have been written between the years 1300 and 1400 of the Christian era.

ARTICLE VI.

An ANSWER to Dr. JOSEPH PRIESTLEY'S ARGUMENTS against the ANTIHLOGISTIC SYSTEM of CHEMISTRY, published in the Medical Repository, and a VINDICATION of the PRINCIPLES contained in the 72d Essay of the fourth Volume of the American Philosophical Transactions. By JAMES WOODHOUSE, M. D. Professor of Chemistry in the University of Pennsylvania, &c.

No. I.

First. OF THE REVIVAL OF A METALLIC CALX IN INFLAMMABLE AIR.

WHEN the focus of a burning lens is thrown upon a calx of mercury, confined in hydrogenous gas, according to the antiphlogistic theory of chemistry, the oxygen of the calx unites to the hydrogen, and forms water; but, according to Dr. Priestley, the hydrogen enters into the metal, while the oxygen is found mixed with that part of the hydrogenous gas which remains behind.

The Doctor declares, in support of this opinion, that, in several of his experiments, the pure air, expelled by the heat of the lens from the mercurial calx, was found mixed with the remainder of the inflammable air, as appeared by the test of nitrous air, and by some disagreeable explosions which happened in the process.

Having performed the experiment of the revival of red precipitate in hydrogenous gas, twenty times, without having met with an explosion, I concluded that Dr. Priestley's inflammable air must have been mixed with atmospheric air. I was of this opinion, because I never could detect any pure air mixed with the inflammable air, after the revival of a mercurial calx in it, by the test of nitrous air.

Since my answer to the Doctor's two pamphlets, I have frequently repeated these experiments, and with the same results as before.

The focus of a lens was thrown upon red precipitate, confined in sixty-two ounce measures of inflammable air, when fifty-two ounce measures of the air disappeared. One mea-

sure of the air which remained behind, tried by the test of nitrous air, produced no red appearance, and gave no absorption.

A quantity of the black oxyd of manganese was also exposed to the focus of the lens, in fifty-six ounce measures of inflammable air, when fifty-four ounce measures of the air disappeared: the remaining air was azotic, and contained no inflammable or pure air, as appeared by applying a lighted taper to it, and by the nitrous test.

Similar experiments were made in the presence of Dr. Seybert, Dr. Jacobs, and Mr. Lee, gentlemen who are perfectly acquainted with the subject in dispute, and who appeared satisfied, that pure air, expelled by heat from a mercurial calx confined in inflammable air, is not found in that portion of the air which remains behind.

I must, however, acknowledge, that I met with an explosion in attempting to revive red precipitate in hydrogenous gas, which I expected contained no pure air. The inflammable gas had been obtained by adding the filings of bar-iron to water which had been impregnated with sulphurated hydrogen gas. Upon throwing the focus of the lens upon one drachm of red precipitate, in eight ounce measures of this air, an explosion *instantly* took place. The pure air, in this case, could not have been given out by the precipitate, for the mercury was not revived; and, as oxygenated muriatic acid* had been formed by the experiment, I cannot account for the explosion until we are better acquainted with the action of iron filings in water impregnated with sulphurated hydrogen gas, and the formation of the oxygenated muriatic acid which is found in the process.

A strong, and, in my opinion, a conclusive argument, in support of the opinion that the oxygen of the metallic calx unites to the hydrogen, and forms water, is, that the disappearance of the inflammable air is always in strict proportion to the pure air which the calces contain.

I have shown that iron absorbs twice as much oxygen as copper, and that the calx of iron makes twice as much inflammable air disappear when heated in it by the burning lens; and if a part of the pure air be driven off from the oxyd of manganese by heat, and the oxyd be then exposed to the action of the lens in hydrogenous gas, a very small quantity of the inflammable air will disappear. One drachm of the oxyd of

* Vide *Medical Repository*, vol. iii. p. 214.

manganese will make twenty-two ounce measures of inflammable air vanish; but the same quantity of manganese, exposed a few hours to a red heat, will make very little of the inflammable air disappear.

In my first answer to Dr. Priestley, I said the manganese was not revived, because no inflammable air could be obtained from it by sulphuric acid and water. It, however, in some cases, appears to be revived, and is of a green colour, as the regulus of manganese is described by authors.

I have often heated a large proportion of red precipitate in inflammable air, confined by water, which would rise in the vessel which contained it until the inflammable air disappeared, when it would immediately begin to fall from the pure air yielded by the precipitate.

In one of these experiments, the whole of the inflammable air having vanished, and the pure air from the precipitate having nothing to unite with, was found, unmixed, over the water, and gave, by the test of nitrous air, an absorption of 160.

If the theory of Dr. Priestley was true, that the pure air of the precipitate was diffused among the inflammable air, an explosion would invariably happen, every time that a drachm, or any larger portion of precipitate, was revived in a considerable quantity of hydrogenous gas.

If one drachm of red precipitate was revived in sixty ounce measures of inflammable air, it would give out ten ounce measures of pure air, which would be mixed with forty-eight ounce measures of inflammable air, and which would never fail to cause an explosion.

Secondly. OF THE CALCINATION OF A METAL IN PURE AND ATMOSPHERICAL AIR.

According to Dr. Priestley, when a metal is reduced to a calx, in pure or atmospherical air, something which has been called phlogiston is emitted from the metal, which unites with part of the pure air, and converts it into azotic or phlogistinated air. He also says, that the phlogiston, in some cases, unites with a portion of the pure air, and forms fixed air, and that this fixed air is produced by calcining a metal which contains no charcoal.

In all my experiments upon the calcination of bar and cast-iron, and copper, in pure and atmospherical air, I could not find that the air which remained behind was injured. When the focus of the lens was thrown upon sixty grains of the

filings of copper, filed for the purpose, confined in sixteen ounce measures of oxygenous gas, twelve ounce measures of the air were absorbed by the metal, which was reduced to a calx. No fixed or phlogisticated air was produced, and the remaining air was perfectly pure.

Dr. Priestley replies to this experiment, that it is impossible to reduce sixteen ounce measures of pure air to four, by calcining a metal in it, and that the remaining four ounce measures should be perfectly pure—for to make dephlogisticated air perfectly pure is hardly possible.

The oxygenous gas which was used was obtained from lead and the sulphuric acid, and gave, by the eudiometer, an absorption of 195 by the nitrous test. Oxygenous gas, equally as pure as this, is seldom met with. It was said to be perfectly pure, because it was supposed the whole of it was devoured by the nitrous test, and that the remaining five hundred parts of a measure consisted of the impurity of the nitrous air, which, Dr. Priestley acknowledges, is very apt to vary in its quality, and very difficult to obtain pure.

Although the Doctor has said, in the *Medical Repository*, that it is hardly possible to obtain dephlogisticated air perfectly pure, yet, in his pamphlet entitled “*The Doctrine of Phlogiston established*,” speaking of dephlogisticated and nitrous air as the component parts of nitrous acid, he mentions, that when they form this acid, “they unite without any residuum, or so small as not to enter into any computation.”* (Page 9). If, then, dephlogisticated air can be obtained to unite with nitrous air, without any residuum, the dephlogisticated air must be perfectly pure.

The oxygenous air which I have since used has been of various degrees of purity, as 180, 178, 169, &c.

The focus of the lens was thrown upon the filings of bar-iron, filed for the purpose, confined in fifty-two ounce measures of oxygenous gas, which had been well washed in lime-water, and was of the purity of 175. Thirty-two ounce measures of the air were absorbed by the metal, which was reduced to a calx. One measure of the remaining air, tried in an eudiometer tube over lime-water, gave an absorption of five hundred parts of fixed air. Another measure of the remaining air, first washed in lime-water, gave, by the nitrous test, 170.

* In the *Transactions of the Royal Society of London*, for 1791, p. 215, Dr. Priestley also speaks of dephlogisticated air so pure as to contain no sensible quantity of phlogisticated air.

Repeating this experiment, by melting the filings of bar-iron in thirteen ounce measures of oxygenous gas, of the purity of 140, seven ounce measures of the air were absorbed by the metal. The remaining air, after being washed in lime-water, was of the purity of 110.

The focus of the lens was thrown upon the filings of copper, in forty-four ounce measures of atmospherical air, of the purity of 93. Six ounce measures of the pure part of the air were absorbed by the metal. One measure of the remaining air, tried in an eudiometer tube over lime-water, gave no absorption, and, consequently, contained no fixed air. With an equal measure of nitrous air, it gave an absorption of 15.

In these experiments no phlogisticated air was generated. The fixed air, formed by melting the iron in pure air, was formed by the coal, which all iron of commerce contains, uniting with part of the pure air. The air which remained behind was more impure than at first, because a portion of the purest part had been absorbed from it by the metals.

Thirdly. OF CARBONIC ACID, OR FIXED AIR.

Dr. Priestley, in order to prove that fixed air is produced without charcoal, mentions that this air is procured by heating charcoal of copper in dephlogisticated air. To this I have replied, that charcoal of copper consists principally of pure charcoal. It is made by passing the steam of alcohol, which consists of hydrogen and carbon, over red-hot copper: the coal is deposited on the copper, while the hydrogen is set at liberty, in the form of hydrogen gas.

The Doctor says, the French chemists have given a much better explanation of this experiment than I have done—but our explanation is exactly the same. The fixed air is formed by the carbon of the charcoal of copper uniting with the dephlogisticated air. My opponent has misunderstood my meaning in explaining the experiment.

Another argument used by Dr. Priestley, to prove that fixed air may be made without coal, is, that large quantities of this kind of air may be obtained from heating a mixture of iron filings and red precipitate. He declares the experiment has never failed with him, and I say it has never succeeded with me.

If large quantities of fixed air can be formed, by heating the filings of pure bar-iron and red precipitate together, then I will pronounce, that fixed air may be made without coal; but I am confident this cannot be done.

From the process which the Doctor has published, to purify iron filings,* it is evident that those he used could not have been very pure, or they would not require to be first heated, then washed in water, and heated again.

Dr. Priestley never mentions whether he used the filings of bar or cast-iron, which is essentially necessary. The filings of pure bar-iron, filed for the purpose, on a clean sheet of paper, exposed to heat with red precipitate, will not yield any kind of air; but cast-iron alone, or mixed with precipitate, will yield both inflammable and fixed air.

One ounce of the borings of cannon, and half an ounce of red precipitate, gave thirty-two ounce measures of air, eleven of which were fixed, and twenty-one inflammable. The fixed air proceeded from the pure air of the precipitate uniting with the charcoal of the cast-iron.

The borings, by analysis, yielded eighteen grains of charcoal to the ounce.

In my opinion, the proofs that fixed air is composed of oxygen and carbon, are as strong as that Glauber's salt is composed of sulphuric acid and soda; for we are not only able to compose this gas at pleasure, but to separate it into its elementary parts.

Mr. Tennant, Dr. Black, and other chemists, have decomposed the carbonic acid, by heating phosphorus and powdered lime-stone. I have performed the same experiment with success. Forty grains of phosphorus, cut into very small pieces, were mixed with powdered lime-stone, and introduced into a glass tube, coated with dung and clay. Upon exposing the tube half an hour to a red heat, and breaking it when cold, the coal was found mixed with phosphate of lime. The phosphorus united with the oxygen of the carbonic acid of the lime-stone, and formed phosphoric acid, which joined with the lime, and made phosphate of lime. The coal of the carbonic acid was deposited among the phosphate of lime.

If fixed air is composed of inflammable and dephlogisticated air,† why is it not obtained by exploding pure air, and the inflammable air from malleable iron?

Speaking on this subject, Dr. Priestley says, "when the inflammable air was from the turnings of cast-iron, there was a considerable quantity of fixed air produced; whereas there

* Medical Repository, vol. ii. p. 267, first edition.

† "We say that fixed air consists of inflammable and dephlogisticated air." Vide Doctrine of Phlogiston established, p. 61.

was either no fixed air at all, or the slightest appearance of it imaginable, when I made use of inflammable air from malleable iron."*

The reason that the inflammable air, from the turnings of cast-iron, yields fixed air, when fired with dephlogisticated air, is, that it holds coal in solution, which unites with the pure air to form the fixed air, and no fixed air is obtained from the inflammable air from malleable iron, because it contains but a very minute portion of coal. If fixed air can be formed by exploding only one kind of inflammable air with pure air, there must be some foreign substance in the inflammable air; and what can this be if it is not coal? for bar and cast-iron differ from each other only in the quantity of coal they contain—an ounce of bar-iron yielding but half a grain of coal, and the same quantity of cast-iron, as I have said before, eighteen grains.

The Doctor says, when any substance, known to contain oxygen, is heated in inflammable air, fixed air is found. (Considerations on the Doctrine of Phlogiston, part first, p. 25.) In the second part of the same pamphlet (p. 24), he informs us, he sometimes gets fixed air. In the Medical Repository, vol. ii. p. 164, first edit. he mentions that no sensible quantity of fixed air is procured in this process. If red precipitate is heated in inflammable air, from malleable iron, the result will be uniform; no fixed air will be generated, but it will be invariably made, if the mercurial calx is revived in carbonated inflammable air, from the pure air of the precipitate uniting with the carbon held in solution in this gas. If fixed air was composed of pure and inflammable air, it ought always to be obtained in this process.

When the focus of a burning lens is thrown upon two drachms of red precipitate, in thirty-two ounce measures of inflammable air, from malleable iron, twenty-two ounce measures of the air will disappear; but when three drachms of the same precipitate are heated in thirty-six ounce measures of carbonated inflammable air, from the flowers of zinc and coal, which has been well washed in lime-water, but two ounces of the air will vanish. In the first case no fixed air will be obtained, but in the second there will be a great production of this gas.

Fourthly. OF FINERY CINDER, or the SCALES of IRON.

Large quantities of carbonated inflammable air, mixed with a portion of fixed air, are produced by heating finery cinder

* Transactions of the Royal Society of London for 1791, p. 221.

32 *Vindication of the new System of Chemistry.*

and charcoal together, though both may have been previously exposed to ever so high a degree of heat. In considering what takes place in this process, we must call to our aid the decomposition of water, the clue which leads us through all the labyrinths of the antiphlogistic system of chemistry. The carbonated inflammable air is formed by the hydrogen of the water, which is supplied by the finery cinder dissolving part of the coal, while the oxygen of the water and finery cinder, uniting with another part of the coal, make the fixed air.

We are under a necessity of admitting the presence of water in the finery cinder. It cannot be in the coal, where Berthollet, Fourcroy, and other chemists find it; for, in my experiments, the coal had ceased to yield air, and, consequently, could not contain water.

In my first reply to Dr. Priestley, I said the iron was not revived. I find, however, after the finery cinder is exposed to heat with charcoal, it will yield inflammable air when mixed with sulphuric acid and water. The iron, then, must be in a revived state. I was deceived, by supposing that a calx of iron could not be revived in a degree of heat less than that at which it fuses. Cast-iron melts at 130 deg. and my finery cinder was exposed to but 24 deg. of Wedgwood's thermometer.

I consider the arguments of the Doctor, relating to finery cinder and charcoal, as a complete refutation of the doctrine of the French chemists, relating to this subject, though I do not think the new theory is essentially affected by any thing which he has advanced. Part of the weight of the scales of iron is certainly owing to water. The advocates of the antiphlogistic system have overlooked the agency of this fluid in the finery cinder.

If, in future, I find that no more fixed air is obtained from the scales of iron and charcoal than from coal and water, I will agree with my opponent, that they contain but a very small quantity of oxygen, or none at all.

Fifthly. OF THE PRECIPITATION OF ONE METAL BY ANOTHER.

Inflammable air is produced, when zinc is used to precipitate lead from a solution of sugar of lead, or iron from its solution in the muriatic acid. The French chemists appear to be unacquainted with this circumstance, as well as with many other important discoveries made by my illustrious opponent.

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Mrs. Fulhame, who has written on the precipitation of metals, was ignorant of the fact.

I have obtained inflammable air,

1st, From the filings of zinc, and a solution of the sulphates of iron and copper.

2dly, From the filings of bar and cast-iron, and the sulphate of copper.

3dly, From copper, precipitated from blue vitriol by zinc, which was washed in water until the water would not precipitate muriated barytes, mixed with the filings of zinc. And,

4thly, From the oxyd of copper, precipitated from blue vitriol by caustic pot-ash, and the filings of zinc and iron.

One scruple of the filings of zinc, and eight ounces of a saturated solution of blue vitriol, in eleven hours yielded no air: a second scruple being added, in the same space of time no air was obtained: upon adding the third scruple, in forty-eight hours one fourth of an ounce measure of inflammable air was produced. The precipitated copper weighed forty-five grains: It was not until after the eighth scruple was used that the air was obtained in any quantity.

Half an ounce of the filings of zinc, and eight ounces of a saturated solution of green vitriol, gave, in nineteen days, forty ounce measures of inflammable air.

One ounce of the filings of zinc, and eight ounces of a saturated solution of blue vitriol, gave, in ten days, sixty-four ounce measures of inflammable air.

The filings of iron afford but a small quantity of inflammable air, compared to zinc, when mixed with the sulphate of copper. One ounce of the borings of cannon, and eight ounces of a solution of blue vitriol, in four days produced but six ounce measures of inflammable air. A considerable degree of heat is generated in this process.

In these experiments, when the precipitant is added in small portions, the operation which takes place is its solution without any production of air. The oxygen of the dissolved metal unites with the precipitant, forming an oxyd, which is immediately dissolved by the acid. The precipitated metal is in a revived state, from the loss of its oxygen. When the precipitant has robbed the dissolved metal of the whole of its oxygen, it decomposes the water by means of part of the acid to which the dissolved metal was united. The oxygen of the water, united to the precipitant, converts it into a calx, which is dissolved by the acid, while the hydrogen of the water is set at liberty.

When inflammable air is obtained from copper, precipitated by iron, mixed with the filings of zinc, the zinc robs the precipitated copper of its oxygen; but as there is not a sufficiency of oxygen in the copper to oxyde the zinc completely, it begins to decompose the water. When a solution of the sulphate of copper is precipitated by zinc, the whole of the precipitated metal is not in a revived state—part of it is calcined.

Upon throwing the focus of a burning lens upon some of this precipitated copper in inflammable air, it made four ounce measures of the air disappear.

Sixthly. Of the AIR CONTAINED in the PORES of CHARCOAL, WHICH HAS BEEN EXPOSED to a RED HEAT.

Dr. Priestley says, that charcoal contains azotic gas, but I have always found it to be atmospherical air. One measure of the air obtained from coal, by means of water, gave, with the nitrous test, an absorption of 90.

ARTICLE VII.

ON THE PHENOMENA, CAUSES, AND TREATMENT OF SEA-SICKNESS.

By EDWARD MILLER, M. D.

THIS disease affects most persons on their first going to sea. It is of various degree and duration in different instances; frequently slight and transient; sometimes severe, protracted and excruciating. In general, it continues only for the first day or two of a voyage, produces little trouble or confinement, and is attended with no danger. In a few cases it begins at the first moment of embarkation, harrasses the patient with incessant tortures for weeks and months, or, at least, recurs with violence at every return of bad weather, and only releases him from his sufferings at the end of the voyage. It has likewise happened, on some occasions, that the symptoms of sea-sickness have not disappeared even on the arrival of the vessel in port, and the patient's going ashore. And examples

have not been wanting of such derangement of the system, by the violence and obstinacy of this disease, as gradually to induce fever of the worst kind, attended with loss of all retentive power of the stomach, and terminating in death.

Sea-sickness is more apt to occur in the open sea, where the waves have an extensive and uninterrupted course of motion, than in gulphs, bays, channels and rivers. It is chiefly troublesome when the sea is much agitated by wind. The vibrating motion of a vessel, from stem to stern, and from stern to stem, which is called *pitching*, or that from one side to another, called *rolling*, produces the severest degrees of giddiness and sickness. These motions are observed when the vessel is going directly before the wind, or when a calm suddenly succeeds a storm, and not when the wind blows obliquely, or on the *quarter*, for then the succussion which the ship undergoes is much diminished.

In small vessels, on which the slightest movement of the waves makes an impression, this disorder is more likely to take place than in very large ones, such as ships of war, or merchantmen of great burden, deeply laden, which, comparatively, undergo little disturbance. It has been also observed, that where habit produces accommodation to the motions of one vessel, removal to another, whether from a larger to a smaller, or from a smaller to a larger, will sometimes again awaken the disease.

Aged persons are seldom affected with the disease, in comparison of those at the younger and middle periods of life. Those of a dark complexion, in general, suffer less than such as are fair: and infants are commonly altogether exempted.

As a description and an example of the sufferings sometimes endured from this disease, the following account is given, by a medical gentleman, of his own case, in the voyage of the embassy from the King of Great-Britain to the Emperor of China. "He felt," he said, "at first, a sickness in his stomach, followed by a retching, when he threw up whatever he had taken into it; then green, and afterwards yellow bile; to which succeeded a thick, mucilaginous, insipid fluid, which he considered to be the gastric juice; and, lastly, grumous blood. Before he vomited the last, he felt a sensation as if his stomach were twisting together, and which motion, he supposed, produced the haemorrhage. Had the blood proceeded from the lungs, he judged it would have been spumous, or mixed with air-bubbles (and florid). He felt constantly a nausea in his mouth; his salivary glands swelled, and the sa-

liver became thickened and vitiated. His mind grew indifferent to all things, either past or future, and even to his existence. Regret and hope were equally extinct within his breast. His head felt light and sore, and as if its futures were separated from each other. It likewise ached; and he had alternate sensations of violent heat and chilling cold. He thought he felt the inversion of the peristaltic motion, and its actual tendency upwards from the intestines to the mouth. Whatever he swallowed he returned, with no alteration of it in the stomach. The bare mention of food, solid or liquid, was loathsome to him.”*

CAUSES OF SEA-SICKNESS.

Sea-sickness† begins with giddiness and vertigo, which not only demand attention in describing the order of the symptoms, but likewise afford a clue to trace the nature and causes of the disease. This species of vertigo originates from disordered action of the organ of vision, produced by the instability and unaccustomed movements of all objects upon the water. That such is the cause of it, is proved from its being excited in some people, though in a less degree, by gazing on the fluctuations of a river (provided no fixed objects appear within the sphere of distinct vision), or by the sight of a large revolving wheel, while the vertiginous persons themselves are perfectly at rest, and, by shutting their eyes, can instantly arrest this troublesome sensation. Another proof that vertigo may arise from the effects of the instability and indistinctness of visible objects on the eyes, is derived from our dependence upon the steadiness of such objects in walking and in balancing the body. We constantly determine the distances of the objects which we approach by our eyes, and, by observing their perpendicularity, regulate our own: hence no one who is hood-winked can walk in a straight line for an hundred steps together. And when children are learning to walk, it is easy to observe the efforts they make to adjust their perpendicularity by surrounding objects, and how instantaneously they fall, when either their attention is unexpectedly called off from this adjustment, or when an object which had caught their eyes, and had been

* Staunton’s Account of Lord Macartney’s Embassy to China, vol. i. p. 145 and 146.

† In this inquiry into the causes of sea-sickness, I have adopted the theory of Dr. Darwin. I have also made use of several of his facts and illustrations, as they are the most familiar and apposite of any which are now within my reach.

[See *Zoönomia*, vol. i. sect. 20.]

Hitherto stationary, is made to undulate. This power of balancing the body by the view of surrounding objects is acquired with difficulty, maintained solely by habit, and may be readily impaired or destroyed by disuse; for persons who have been long confined to bed are found to reel and stagger in their first attempts to walk, and only by patient endeavours recover their former steadiness. The principle of our dependence upon vision in balancing the body by external objects, and of the tendency to vertigo whenever that sense is impaired by disturbance or disease, is still further illustrated by the vertiginous sensations which often affect elderly persons when they begin to suffer dimness of sight, and which are frequently relieved by the use of spectacles, or, at length, by acquiring the habit of adjusting perpendicularity by objects less distinctly seen.

That distinctness of visible objects which is requisite to the balancing of the body with steadiness, and to the prevention of vertigo, may be diminished or destroyed in various ways, all of which seem to throw light upon this subject. Objects may become indistinct, 1st, by reason of their *smallness* and *similarity* to one another. Many persons become dizzy in a room hung with paper coloured with small and similar figures, where the eyes do not readily find a resting place, nor distinguish their movements in continually passing from one figure to another. But by affixing to the wall a sheet of white paper, or by drawing figures of a larger or more diversified size, the giddiness becomes no longer perceptible. It is for the same reason that vertigo is produced, in some, by passing over a plain covered with snow, without trees or other eminent objects. 2. Objects become indistinct, and the beholder vertiginous, on account of their *distance*, and the *direction* in which they are seen. It is for this reason that many become giddy in ascending lofty heights, or in looking down a deep precipice. Objects, placed at such a distance, are beyond the sphere of distinct vision, and, therefore, unsuitable to regulate our perpendicularity. The debilitating impression of fear must likewise be admitted, in this case, to produce a share of the effect. 3. The distinctness of objects is lost, and giddiness produced, by their *unusual* and *excessive motions*. Instances of this sort are very numerous, such as the view of a great cataract, of a large revolving wheel, &c. the first attempts to ride on horseback, to mount a camel, an elephant, &c. riding backwards in a coach, swinging, riding in a sleigh, skating, turning swiftly round on one foot, and more especially in the case now under consideration.

The effect of these motions upon the organ of sight is also much increased by the *ocular spectra* of objects remaining some time upon the retina, which exceedingly augment the disturbance of the eyes, and thereby add to the confusion of the vertiginous person. When any one turns rapidly round till he becomes giddy, and falls upon the ground, the spectra of circumambient objects continue to present themselves in rotation, and he seems to behold such objects still in motion. These spectra appear to be a continuation of the motions of the optic nerve, which had been excited by the objects which they feverally represent. They are apt to remain, to recur, or to be prolonged, in proportion to the degree of debility induced; hence they must greatly aggravate the more violent cases of sea-sickness, and produce an infinite number of deceptions of the sight and of imagination. Their effects are well known in fevers of debility, by producing the symptom called *muscae volitantes*, &c.

Besides the vertigo of disordered vision, it is probable sea-sickness is generally produced, in part, by another species—that of disordered touch or feeling—and which has been called *tangible vertigo*. When a blind person turns round, or when one who is not blind revolves in the dark, a vertigo is produced belonging to the sense of touch: for his feet now touch the floor in manners or directions different from those they have been accustomed to; and, in consequence, he becomes bewildered as to the situation of his body in relation to the floor, loses his perpendicularity, and is rendered giddy. This combination of visual and tangible vertigo, in producing the phenomena of sea-sickness, seems to have escaped the attention of those who have treated of this disease. Sailors remark, that such persons as can soonest accommodate themselves to the ship's motion, and acquire the habit of standing and walking uprightly, without reeling to and fro, are least distressed by sea-sickness, and most speedily recover. The instability of visible objects, and the reeling induced in the beholder, reciprocally increase one another.

Having thus mentioned some of the various modes in which vertigo may be produced by a disordered and excessive action of the organ of vision and of touch, particularly such as arise from the rotation, undulation, or other irregular and unusual motions of external objects, as well as of the beholders, I am, in the next place, to show in what manner vertigo produces the nausea and vomiting which quickly ensue.

It does not appear, at first view, how nausea and vomiting

proceed from a disturbance of the action of the visual organ. But when it is recollect that violent giddiness, the immediate result of such disturbances, precedes and occasions these perversions of the alimentary canal, the difficulty vanishes. Vertigo, and disorders of the alimentary canal, reciprocally produce each other. Professor Gregory, of Edinburgh, asserts this in the following words: "*Vertiginem nausea solet comitari, alteraque alteram inducere.*"* It is not the present object to inquire into all the species and varieties of vertigo which may be found enumerated in systems of nosology; but whether accompanying the attack of apoplexy, palsy, epilepsy, hysteria, or syncope; whether induced by injuries of the head from external violence, by excessive evacuations, or at the accession of fevers, it is generally attended with sickness of stomach. And, on the other hand, when the alimentary canal is primarily disordered, as in cases of indigestion, taking emetics, drunkenness, swallowing of poisons, gastritis, enteritis, &c. vertigo is generally found to take place. Sea-sickness is, therefore, a consequence of certain sympathies, or associations of motions of different parts of the animal system. And there is ground to conclude, that the vomiting caused by a stone in the bile-duct or in the ureter, as well as that arising from inflammation of the intestines, or at the accession of fevers, is produced in a similar manner.

If it be admitted that certain organs, or parts of the body, become associated in their actions (and the proofs of such an association continually recur in observing the functions of the animal system), it will follow, that, in a state of health, each organ, or part, in this associated series or circle, has its appropriate share of nervous or vital power. But if one of these organs or parts be subjected to violent or irregular action, as such action consists in the employment and expenditure of nervous power, the balance of the distribution of this power must be disturbed, and while one part expends too much, the others will possess too little. This is obviously illustrated by the appearances of drunkenness. While the stomach is stimulated to excel by fermented or distilled liquors, the muscles of voluntary motion, the optic nerves, &c. are deprived of their share of nervous influence; and hence the inebriate becomes vertiginous, and his limbs refuse their accustomed office. Just so it is with persons unaccustomed to the motions of the water, when they go on shipboard. The excessive,

* *Conspicetus Medicinæ Theoreticæ*, vol. i. p. 145.

irregular and unusual actions of the organ of sight, expend a disproportionate share of nervous power, and, of consequence, the parts connected with it by association must soon suffer by a deprivation of their proper quantity. The stomach, which possesses more extensive and intimate relations with the rest of the system than any other viscus, will be the first to feel, and afterwards to propagate this morbid impression to other parts of the body.

Attention to the following circumstances will go far to explain the seeming disproportion between cause and effect, in this mode of accounting for the violence of sea-sickness in persons unaccustomed to the instability of that element. 1. The motion is not only unusual, irregular and complicated, but excessive. The movements of the waves, forming a vast expanse of surface, agitated and rolling in a thousand shapes—the diversified movements of the ship, with all its variety of parts and appurtenances—and the movements of the voyager himself reeling and staggering in every direction: all these form an aggregate of agitation sufficient to distract the steadiest head. The contrast between this scene and such as are found on the land, where a great majority of objects are either at rest, or moving with steadiness and regularity, must be apparent to all. 2. The excessive action of the organ of sight, produced by this aggregate of unusual motion, will not appear strange if the quantity of nervous power expended on the eyes be duly considered. No part of the system, in proportion to bulk, is so plentifully supplied with nerves as the eyes. Each optic nerve is as large as a crow-quill at its entrance into the eye. Besides these, the third, fourth, and sixth pairs of nerves, as well as part of the fifth pair, belong to this organ. The incessant employment and activity of vision, during the day, considered in connection with the size and number of the nerves devoted to this sense, will evince that the consumption of nervous power in the eyes is fully as great, if not greater, than that bestowed upon the whole of the upper extremities. 3. The intimate sympathy between the brain and the stomach is also to be considered; whereby the disordered actions of the organ of vision, which possesses so large a branch of the nervous system, make an immediate and powerful impression on the stomach, invert its motions, cause profuse discharges of bile, &c. and produce all the train of distressing sensations which belong to sea-sickness.

It is surprizing to observe what slight causes will, in some constitutions, produce vertigo. An unusual posture, an in-

considerable elevation from the ground, and even a momentary view of objects moving so as to attract the gaze of beholders, will sometimes excite this sensation. Small modifications of motion will also serve to relieve, as well as to produce it. A lady informed me, that, after constantly suffering nausea for some time, from riding in a sleigh, she was relieved, in the latter part of the journey, by a more harsh and rugged motion, in consequence of the snow suddenly dissolving, and leaving the earth bare. In this case, it is probable that the smooth and almost imperceptible progress of the sleigh, while gliding over the snow, prevented the lady's distinguishing the apparent motions of objects which were absolutely at rest, from the real motions of them; and this confusion seems to have been, at least in part, the cause of her giddiness and nausea. The course of the sleigh over sand, gravel, &c. was a nearer approach to ordinary habits of motion.

It is fortunate for such as are destined to a sea-faring life, and to other employments which are apt to produce similar giddiness and nausea, that these affections are commonly of short duration. The dominion of habit, in these cases, is extremely favourable. The Dervises of Turkey, who practise the motion of turning themselves swiftly round as a ceremony of religion, soon learn to perform it without giddiness. A similar habit is acquired among the *Shakers*, a fanatical sect of religionists in the State of New-York. My colleague, Dr. Mitchill, informs me, that he saw a female of that sect turning herself round about sixty times in a minute, for the space of five minutes, without interruption; and this was done without any appearance of her becoming vertiginous.

A question naturally arises on this subject, why some persons are more liable than others to vertigo and nausea, in consequence of unaccustomed motions. This is the result of a greater promptitude, in some constitutions, to run into sympathetic or associate actions. It is not easy to assign the reason why movements of the animal system, which have once occurred in succession or combination, should afterwards acquire a tendency habitually to succeed or accompany each other. It is a property of animated nature, and distinguishes this department of being from others. There seems to be a peculiar temperament, consisting in the too great facility with which fibrous motions acquire habits of association, and in the strength with which these associations are maintained. In constitutions of this sort, sympathy acts with more certainty and energy, and to much greater extent, than in others.

And it is probable that such persons are much more liable than common to all the class of sympathetic diseases. For example, it might be expected that such would be peculiarly disposed to the attack of intermittent fevers; that the periodical return of paroxysms, in these cases, would be more difficult to arrest; and that they would be liable to recur, from slight causes, for many weeks after they had appeared to be cured. The force of memory seems also to depend upon the possession of this temperament; for memory is understood to mean facility and strength in forming and retaining associations. It would be matter of curiosity to ascertain, whether persons of retentive memory are more liable to fevers, to sea-sickness, and to all the various diseases of association, than others.

TREATMENT OF SEA-SICKNESS.

Having thus endeavoured to describe the appearance of sea-sickness, and to assign the more probable causes, I proceed, in the next place, to the treatment of the disease.

Much may certainly be done towards the prevention of this disorder. It has been proposed, that persons intending to go to sea should, for some time previously, accustom themselves to swinging, or to some other unusual motions adapted to induce giddiness. The exercise of turning round upon one foot would probably answer this purpose as well; and it may be acquired, after some practice, so as to be performed entirely without vertigo.

Sea-sickness, like many other diseases of association, is greatly under the dominion of emotions and passions of the mind. By forcibly directing the attention to a particular object, the nausea may be relieved, at least for a short time. By joyful or alarming news, by the terrors of a storm or of shipwreck, by the prospect of battle, and by violent pain, such as the anguish of a broken or dislocated bone, the disease may be instantly arrested. But as such degrees of emotion and pain cannot safely be excited on many occasions, and are not susceptible of measure or regulation, they are obviously unfit for practical purposes.

It has been asserted, that keeping the eyes shut or covered, if begun immediately upon embarkation, will prevent sea-sickness. According to the principles maintained in this paper, such an expedient cannot be without use. In a short passage particularly, lying horizontally, sitting or standing, so as to be firmly and steadily supported in one position, with

the eyes, for the most part, shut, is by no means impracticable, and deserves to be strongly recommended. I am informed, by a gentleman of observation, that, while at sea, he enjoyed almost total exemption from this complaint during the darkness of the night, and while he lay horizontally, with his eyes closed, but always experienced a return of it the next morning, as soon as he arose, and began to look at surrounding objects. All agree that it is proper to avoid watching or gazing at the waves, especially when they are strongly agitated by tempest.

The proper management of diet will do much both in the prevention and cure of this disease. It is advised to eat moderately and frequently, to avoid every thing calculated to produce indigestion, and to select such articles as the stomach can digest with the greatest ease, expedition and certainty. For this purpose mariners recommend bread and fresh meat to be eaten cold with pepper; but the occasional use of salted meats will not be found hurtful, and sometimes they undoubtedly deserve a preference. Some contend, that keeping the stomach constantly full, by eating biscuit, &c. is one of the best preventives; and it is not improbable that the stimulus of nutritious and well-adapted food, combined with the stimulus of distention, may be so adjusted as greatly to fortify the powers of the stomach. For drink, it is recommended to use liquids impregnated with the vegetable or carbonic acids—such as lemonade, felszer-water, found malt liquors, cyder, champaign, &c.

The sea-sick are advised to keep much upon deck, even in all varieties of the weather. It is also enjoined upon them to take brisk exercise, such as assisting at the pumps, or any other active employment, with as little intermission as the nature of the case will allow: for it has been generally remarked, that indolent and slothful passengers are most apt to suffer from this complaint. Governor *Winthrop*, in his *Journal*, mentions the efficacy of exercise, on a voyage, as a remedy for sea-sickness, in the following terms: "Our children and others that were sick, and lay groaning in the cabbins, were fetched out; and, having stretched a rope from the steerage to the mainmast, we made them stand, some of one side and some of the other, and swing it up and down till they were weary, and by this means they soon grew well and merry."*

As sea-sickness is undoubtedly a disease of association, and,

* *Winthrop's Journal of the Transactions and Occurrences in the Settlement of Massachusetts, &c. page 6.*

in that respect, akin to the nature of fevers, it is probable that the stimulant and invigorating remedies employed to repel the attack, as well as to prevent the recurrence of the paroxysms of intermittent fevers, might also be successful in guarding the stomach against the invasion of this complaint. The Peruvian bark and other bitters would be likely to answer this purpose. And after the actual attack of the disease, if great prostration of strength and exhaustion ensue, these remedies, combined with wine and opium, as in fevers of debility, should be assiduously used.

Preserving regularity of the intestinal discharges, and occasionally exciting some degree of artificial diarrhoea, will form an important part of the treatment. The aloetic preparations are among the most suitable of the cathartic class. If acidity be troublesome, as often happens to the feeble and dyspeptic, magnesia will become necessary. Injections of sea-water and soap are always convenient, and deserve to be very frequently employed. It is probable the injection of cold water, or iced water, which, according to Mons. Pomme, so instantaneously relieves the inverted motions of the alimentary canal in hysteria, would likewise prove an efficacious remedy in this case. (See *Pomme Des Affections Vaporeuses*, p. 25.)

As the stomach and skin are very strongly associated, the former may be often excited into action, and supported, through the medium of the latter. For this purpose the sea-sick may use the warm bath alone, or alternated with cold bath, friction of the skin with oil and camphor, or dry, with powder of mustard: to the epigastric region they may apply plasters, epithems or cataplasms charged with aromatics and opium, and, in severe cases, sinapisms or blisters.

Compression of the abdomen, by means of a bandage or handkerchief, is recommended by seamen, and, there is reason to suppose, on good grounds. The savages of North-America, when restricted to scanty food, and pressed by hunger, fasten a belt round their bodies: by this they give support to the empty and enfeebled stomach, and thereby provide a substitute for the stimulus and distention of food. When the stomach has been long harassed with the retchings of seasickness, this mechanical aid will assist in sustaining the system until it becomes habituated to its new situation.

It will seldom be requisite to combine many of these remedies in the treatment of a single case. For the most part, relief is easily and speedily obtained, and the common method may be delivered in a few words: When nausea comes

on, and cannot be subdued by mental exertion, the patient should place himself in a horizontal position, shut his eyes, and lie perfectly still. If vomiting succeed, he should take some draughts of an infusion of chamomile, peppermint or ginger, or something similar. Sea-water is commonly recommended by mariners. When the stomach has been thoroughly emptied by the assistance of such drinks, it becomes necessary to use some grateful stimulant. I am informed, that on board of the packet-boats plying between the British ports and those of the adjacent continent, for the conveyance of passengers, that spiced wine is the common remedy. Where this fails, recourse may be had to small doses of sulphuric (vitriolic) ether, frequently repeated, till it compose the stomach. Small doses of opiates should also be tried. The effervescent mixture of Riverius, seltzer-water, lemonade and warm punch, will succeed in some cases. But if the disease, notwithstanding, should obstinately continue, the stomach be harassed with incessant retchings, and exhaustion and debility take place to an alarming degree, it will be requisite to adopt the treatment usually pursued in low fevers of debility. Preparations of Peruvian bark, or rather of cumbo or quassia, with wine and opiates, or ether, employed in rotation, and periodically repeated, so as to sustain a moderate and equable excitement of the stomach, will especially claim attention. And, in such extreme degrees of the disease, the other remedies above-mentioned may likewise be selected or combined in such manner as to suit the exigencies of the particular case.

It is often necessary to attempt the cure of one disease by exciting another. With this view phthisical patients and others often are sent to sea. Instead of inquiring into all the circumstances of a sea-voyage which may prove beneficial in such diseases, it will be sufficient for the present purpose to consider the affection of the stomach as one of the chief means of relief. The instances of the efficacy of this remedy are too numerous and remarkable to admit of a doubt. But it has happened, in many cases, from some peculiarities of the stomach or constitution generally, that the usual nausea and vomiting have not occurred, or have been so slight and transient as to disappoint every hope of advantage from the voyage. As the efficacy of this remedy really depend upon the excitement of nausea and vomiting, it is much to be regretted that such a disappointment should take place; as it seems always

to be in the power of the voyager to increase the force and duration of the nausea, by artificial means, to any desirable extent. Swinging, in one form or another, may conveniently be employed in aid of the marine vertigo. If the oscillating or pendulum-like swing should not prove sufficient to create the requisite degree of vertigo, the patient might be whirled in a chair suspended from aloft by two parallel cords hanging near to each other, which, after being circularly revolved fifty or one hundred times in one direction, would return with great velocity in the other. Or, if the debility of the patient should not allow this kind of motion, a small bed, affording room to lie in an easy position, might be suspended to a simple machine adapted to whirl it with any proper degree of gentleness or velocity. By some of these means, varied in such manner as to suit the circumstances of each particular case, there can be no doubt that vertigo might be increased and regulated at pleasure.

In other cases, likewise, besides phthisis pulmonalis, the marine nausea might be usefully augmented by additional unaccustomed motions. The noted example of its efficacy mentioned by Mr. John Hunter, in causing the matter of a large bubo to be unexpectedly absorbed, is a proof of great power in promoting the action of the lymphatic vessels. The use of emetics, in chronic diseases, might, perhaps, be entirely superseded by sea-sickness, properly assisted and regulated by some of the other means of exciting vertigo.



R E V I E W.

ART. I. A Memoir concerning the Disease of Goitre, as it prevails in the different Parts of North-America. By Benjamin Smith Barton, M.D. Professor of *Materia Medica, Natural History and Botany*, in the University of Pennsylvania, and one of the Physicians of the Pennsylvania Hospital. Philadelphia. Way and Groff. 8vo. pp. 94. 1800.

NOT only are the inhabitants of the western continent afflicted with the more *common* distempers of Europe and the other quarters of the globe, but the rarer and more singular complaints to which the human constitution is there liable, are manifesting themselves in North-America. In a widely extended country, reaching from the confines of Acadia to the limits of Florida, there exists a great variety of climate. And in the range from the ocean to the stream of the Mississippi, the diversity, occasioned by alteration of latitude, is exceedingly increased by intervening and local circumstances, which chequer the scenes and the seasons in a remarkable manner. From the low plains in the vicinity of the Atlantic, through the gradual risings, to the summit of the Blue, the Allegheny, and Appalachian Mountains, and the descent thence to the water-level on their further side, the earth presents a surface changing almost perpetually. The high peak, the gentle declivity, the abrupt precipice, and the deep ravine, exhibit their respective peculiarities. From the lofty and ventilated mountain-exposure, and the dry land agreeably alternated with hills and dales, the transition is gradual to the pent-up valley scarcely reached by the breezes, and the dead level where water stagnates, and fogs and exhalations overhang the watery marshes, the dismal swamps, and the tracts in their neighbourhood. In some districts the great strata of the earth consist chiefly of granite, and of the separate bodies which constitute that mineral compound; in others the predominant layers are of arenaceous matter, compacted and hardened into one. Now the eye of the traveller, day after day, as he journeys along, beholds *slate*; and the different species of

shistic fossils lie thick beneath his feet; and then again he proceeds, for an equal distance, over beds of calcareous earth, exhibiting the forms of lime-stone and marble. Here the eye surveys a wide and barren extent of land; there it dwells upon a tract rendered fertile by the overflowing of rivers, and the gradual deposition of decaying animal and vegetable substances for ages. To these differences of situation are to be added the great changes to which the weather is liable, from moist to dry, from tempest to calm, and from excessive cold to almost intolerable heat, in a region influenced by Ontario, Erie, Huron, and the other lakes, on the one side of the interjacent mountains; and by the ocean, and the gulphs of Mexico and St. Lawrence, on the other.

In such a country, it may be expected that the human constitution will suffer many and variegated diseases. As far as there is a coincidence or similarity of morbid causes, in this as in the other hemisphere, distempers of a like kind can hardly fail to break out. And this disposition of the physical powers to debilitate or disfigure the body in America, may be facilitated by the predisposition to a given distemper, or the actual existence of it, in an emigrant from any part of Europe in which scrophula, phthisis, or goitre prevails.

To the investigation of the latter of these distempers, as it occurs in North-America, the author of the present tract has turned his attention. This is the work which was announced, as our readers will recollect, in our vol. i. p. 386, first edition.

Dr. Barton found the goitrous swelling of the neck among the Oneida and the Brother-Town Indians, and describes it as occurring on the German Flats, at Fort-Dayton, and at Henderson-Town, among the white inhabitants, in the neighbourhood of the Mohawk River.

"Some of the most remarkable cases of the disease are in a Dutch family which lives upon the north side of the Mohawk River, immediately opposite to Old Fort-Schuyler. This family consists of a father, a mother, and four or five children. Every one of them is afflicted with the goitre. The swellings occasion some of them to look hideous. This family removed from the river below this, to the place where they now dwell, about fifteen years ago, at which time they had nothing of the disease among them."

He found it to be frequent, also, in the military tract, especially in the town of Manlius, in the Onondago-hollow, and the neighbourhood of the Salt-Springs, affecting both

Indians and whites. Though infants at the breast are not exempted from it (such cases being rare), yet it is much more common among adults. Persons who have removed into the country where it prevails, have become subject to it at a very advanced age. Females are more liable to it than males; they are especially its victims. It is said, also, to affect brute animals, especially sheep and young calves, in the above-mentioned town of Manlius, in New-York. Within this State, the author thinks its existence limited between the Little Falls of the Mohawk, eastward, and the settlement of the Tuscaroras, near the extreme westernmost boundary, in the vicinity of the Great Cataract of Niagara. Its northern and southern extent he has not been able to define; though he observes it has occurred in Lower-Canada, between St. John's and Montreal—on the Connecticut-River in New-Hampshire—in the county of Bennington, in Vermont—in the Cohos Country in Connecticut. Within the territory of Pennsylvania, it is stated as occurring at Pittsburgh, on the waters of the Allegheny and French Creeks, at Sandusky, on the Monongahela, and among the Indians on Big-Beaver-Creek: also on the River Muskingum, among the aborigines; and here, as at the last-mentioned places, principally affecting the women and girls. There have been several cases, too, among the Canadians of Detroit, and among the settlers at St. Vincennes, on the River Wabash.

In the part of the author's inquiry which respects the cause of goitre, he examines the opinion of **DE LUC**, that it proceeds from water impregnated with earthy substances, prone to form tophous concretions; of **COXE**, that it is caused by *tuf*, or calcareous earth, held in solution by the water which the goitrous inhabitants of the Alps constantly drink; and, of the inhabitants of the State of New-York, that it is owing to the quality of the water of the country, which is highly charged with lime-stone. These, which form what may be called the **CALCAREOUS HYPOTHESIS**, Dr. B. with great candour and impartiality, examines and rejects. He even doubts whether the water drank by the people of a region or district, in any manner, occasions this complaint, and quotes the great Haller of Berne, as possessing a similar scepticism.

He then considers the notion of the goitre being produced by *snow-water*, or the water of melted snow, and shows its impossibility very strikingly; the opinion of **GAUTIERE**, that it arises principally from exposure to *cold*, and the drinking of very *cold* water; and that of **G. FORSTER**, that it is caused

by drinking of water deprived, by freezing, of its *fixed air*; to both which he offers decisive objections. He also examines and rejects the ideas of this disease being induced by the drinking of water supplied by springs *near beds of fossil coal*, or of the same fluid impregnated by certain vegetables; as also the notion of its being produced by *insects infesting the water*, or the **ANIMALCULAR HYPOTHESIS**; and that of its origin from *coarse and unwholesome food*, except as such diet may operate as a predisposing cause, with several other speculations.

The learned author next discusses the theory of Mr. DE SAUSSURE, according to which goitre is caused by a *heated and stagnated air*, owing to the confined situation of the valleys in which the disease frequently appears in Switzerland. This, however, he does not adopt, because, in America, the goitre is not confined to valleys, but prevails in some of the high and level plains of the country—and in some of the more deep and narrow valleys it is altogether unknown.

Lastly, Professor Barton, with great caution and modesty, offers his own opinion on the exciting cause of goitre, which is, that it is a miasin of the same species as that which produces *intermittent and remittent fevers, dysenteries, and similar complaints*. The author expresses himself thus :

“ Do intermittents and remittents prevail in those parts of the countries of North-America in which the goitre is most commonly met with? I have already said that they do. Many facts, however, must be collected before this question can be answered as extensively as it ought to be. Meanwhile I shall mention some of those districts in which both these fevers and the disease of which I am treating are very common.

“ I have already observed, that the Onondago-Valley, where goitres are frequent, is unwholesome. Intermittents and remittents, and these sometimes of a very malignant kind, are frequent here. These complaints are frequent in Manlius, Pompey, and other parts of the military tract. They are frequent along the Mohawk and Connecticut Rivers; between St. John’s and Montreal; about Detroit; on the Muskingum; and in almost all those parts of our country in which the goitre is found. It has, indeed, been said, that intermittents are unknown at Pittsburgh. This is not strictly true. On the contrary, these complaints are known to exist in that place, and have evidently increased within a few years.

“ In the present state of our information, it will be difficult

to prove that the goitre does actually owe its origin to the same causes which induce intermittent fevers. We are certainly not yet prepared to decide upon this subject (as philosophers should decide upon every subject which they undertake to investigate) with caution. I may add, that many difficulties oppose themselves to the conjecture which I have thrown out. In particular, it is not easy to conceive how a general cause, stimulating the system, and inducing the cold and hot stages, and other phenomena of fevers, should concentrate its action so completely upon the thyroid and neighbouring glands of the head and neck, and give rise to the disease of goitre. Perhaps, however, an extensive view of facts relative to the production of diseases by the *miasmata* of marshes, would serve to show the immense variety of ways in which these miasmata affect us, and the multifarious diseases which they induce in man and other animals. There is something very capricious in the operation of these agents. And I do not know that it is more inconceivable, that the effluvia of which I am speaking should especially affect the thyroid gland, and induce goitre, than that they should especially affect the parotid glands, producing mumps, or the liver, producing hepatitis.

" It may, perhaps, give some additional weight to the theory which I have proposed, to observe, that the marsh miasmata of some parts of our country exert a particular action upon the glands of the neck and throat. Kalm has given some account of a disease, called by the Swedes the 'stitches and burning,' which, at different times, has committed great havoc at Penn's Neck, in Jersey. ' It was (says our author) a true pleurisy; but it had a peculiarity with it, for it commonly began with a great swelling under the throat and in the neck, and with a difficulty of swallowing.'*

" The complexion of many goitrous persons, especially those in whom the disease has arisen to a considerable height, is an additional circumstance in favour of the opinion which I have advanced. ' Their complexion (says De Saussure, speaking of the crétins) is a yellow approaching to brown, from which, probably, they obtained the name of *marons*,† which is given to them in the valley of Aoste.'‡

" I was informed that, in the State of New-York, those

* " Travels into North-America, &c. vol. i. p. 376, 377, &c. Warrington. 1770. English translation.

† " The maron is a large kind of chestnut.

‡ " Voyages, &c. tom. ii. p. 481.

persons who are affected with goitre are commonly exempt from intermittents, though in the midst of persons labouring under these latter complaints. If this be a fact, it would rather serve to show, that the goitre and the intermittent are owing to the same cause.

" I am far from imagining that the preceding facts completely establish the origin of goitre from the miasmata of marshes. I have offered this opinion merely as a conjecture or hypothesis. I cannot, however, help suspecting that future and more extensive inquiries will establish the fact, that there is a very intimate connection between the disease in question and the exhalations from marshy grounds. Persuaded I am, that there is a necessary connection between the disease and a moist atmosphere.*

" Mr. Foderè is of opinion, that a warm and moist atmosphere is the cause of the goitre. This writer, whom I have so often quoted, made his observations in Maurienne, where the disease is extremely common, perhaps more so than in any other part of the world. It is remarkable that the goitre prevails to the greatest degree in the western parts of North-America, where many observations have conspired to show, that there is a greater quantity of moisture in the atmosphere than in the countries between the Atlantic and the Allegheny Mountains. ' From a variety of observations (says Mr. Andrew Ellicott), I am convinced, that the atmosphere in the western country, and particularly in the vicinity of the lakes, contains a greater quantity of moisture than in the middle Atlantic States. The wooden works which contained my instruments were always uncommonly swelled, and frequently very much injured in that country, though constantly defended from the rain, and occasionally exposed to the sun. The ivory and wood of my sectors, with brass joints, always expanded above the metal. This expansion was not sudden, but effected by slow degrees.' †

" My own observations, which will be detailed at length in another work,‡ coincide with those of the ingenious gentleman

* " I do not now speak of insulated or detached cases of the complaint, for they occur every where; but of the disease where it is a common complaint. Even those aerial tumours which arise in women after parturition, seem only to arise in those situations where the complaint, from marsh miasmata, or from moisture, is endemic.

† " Transactions of the American Philosophical Society, vol. iv. No. xxv. p. 225 and 226. Philadelphia. 1799.

‡ " Travels through part of Pennsylvania, Virginia, New-York, &c. &c.

just quoted. The greater degree of moisture, in the neighbourhood of the lakes, is, perhaps, the best explanation of the fact which I have already mentioned, that, in general, the goitre ‘prevails to the greatest degree in the neighbourhood of the lakes of the country, or about the first sources of the rivers which arise near these lakes.’

“Mr. Ellicott has likewise observed, that ‘fogs are very common, and of remarkable density,’ on the Ohio and Allegheny, and their branches. This accords with my own observations. I cannot, however, agree with Mr. Ellicott, that these fogs do not contain ‘any portion of those noxious miasmata which are so frequently combined with the fogs on the eastern side of the mountains.’ On the contrary, I am persuaded, that the fogs of the western, as well as of the Atlantic country, are often very insalubrious. I know, at least, that many parts of the country along the Ohio, and other western waters, are very unhealthy. I do not doubt that the dense fogs are one great cause of this unhealthiness; and, I believe, that such fogs are insalubrious, chiefly by reason of the miasmata which they contain. This is not the place to examine the contrary opinion, which has been adopted by Mr. Ramel.”

The work is concluded by a short chapter on the medical treatment of the disease; and blood-letting, purging, quick-silver, burnt sponge, sulphure of pot-ash, and several other remedies are mentioned. An appendix of sixteen pages contains a variety of learned and instructive matter.

As, in the course of this work, Dr. B. has several times referred to the Essay on Goitre and Cretinage of Mr. Foderè, published in 8vo. pp. 290, at Turin, in 1792, we shall lay before our readers an account of this publication, with the intent, as far as we are able, of aiding the researches of those who are striving to detect the cause, and thereby the prevention and cure, of a disease which always disfigures the body, and is frequently connected with idiotism, stupidity, or deplorable imbecility of mind.

(To be continued.)

ART. II. *A Treatise on the Plague and Yellow Fever, &c,*
By James Tytler.

[Continued from vol. iii. p. 379, and concluded.]

HAVING offered the fruit of his researches concerning the *plague*, as a disease specifically distinct from every other, in the first part of his treatise, Mr. Tytler proceeds, in the second great division of his work, to exhibit the product of his labours on the subject of *yellow fever*.

This distemper, he inclines to think, was not originally a native of the western world, but was imported into Martinique from Siam, in 1685, and spread thence, by contagion, to St. Domingo, Barbadoes, and the neighbouring islands, till, at length, its baleful presence afflicted the continent of America. He does not give us any account of its history among the Siamese, nor even state the proof of its existence in that country; nor does he mention whether this malady was a scourge in the hand of Providence to chastise the East-Indians for their sins—nor, if so, what the kind and enormity of their offences were. We are left to conjecture the cause, and, by the similarity of the cases, to suppose it was some misdemeanor not unlike that for which the Jews were punished with the plague. This latter story seems to us full as philosophical and worthy of credit as the former. Mr. T. also leans towards the possibility of the Indians of the more northern latitudes having received the seeds of malignant diseases from the fleet of Sebastian Cabot, who coasted along the continent in the reign of Henry VII. as, in the army of that prince, not many years before, the sweating sickness, he says, had been introduced into England. The *possibility* of this we shall not deny; but we can see no more likelihood or probability in *this* than in the *two* other examples of origin and derivation this gentleman has favoured us with. This is his first chapter, which abounds with quotations from Moseley, Hillary, Hughes, Webster and Sauvages.

In his second, which runs to the length of one hundred and twenty-four pages, Mr. T. states, at some length, the descriptions of yellow fever by a number of the more distinguished writers on that disease, such as Moseley, Lining, Lind, Hillary, Jackson, Chisholm, Rush, and other practisers and dissectors. From an examination of all which he gravely concludes, not only that the plague is *essentially* different from the distempers described by these authors, but that the *yellow fever*,

the fever of Boullam, and that of Philadelphia, in 1793, "though nearly allied," "can none of them, with any kind of propriety, be called higher and lower degrees of the rest," (p. 433). He then proceeds to an inquiry, whether or not they are *contagious*? And, after reviewing the controversy about the disorder, as it appeared in Grenada, New-York, Philadelphia, Norfolk and New-Haven, determines the question in the affirmative, and that the contagion is, in all cases, *specific* and *immutable* (p. 465); yet allows, afterwards (p. 479), the possibility "that diseases may change their nature"—and that the pestilential poison, when transported "to the western continent (from Europe or Asia), may assume a different, and, in many respects, an opposite nature; the two diseases, being thus like the opposite poles of a magnet, scarce agreeing in any thing but the common work of destruction." It is admitted that the aborigines of North-America were afflicted by pestilential diseases before their country was possessed by the whites. Mr. T. explains this, by supposing that two Indians, who, in the time of Sir Ferdinando Gorges, had been to England, brought the *contagion of plague* with them, which, in the American climate, turned to yellow fever, or something like it. What a pity that the bodies and clothes of these men, as well as Dr. Brattle's and Mr. Anthony's *wigs*, *had not been smoked!* (p. 466). In our judgment, the contagion contended for, which we never considered as proved before, has not acquired any additional evidence: for we must own that Mr. T. with all his learning, industry and conjectures, instead of convincing our understandings, has only shewn, more glaringly than we have observed on any former occasion, to what desperate shifts the supporters of the contagious hypothesis are driven.

Mr. T. in his third section, mentions various preventative modes and cautions, and, among others, abstinence from animal food, tea, coffee and chocolate, with somewhat a sentiment of disapprobation. He then recites some of the means of prevention recommended by Rush and Chisholm.

After this the writer gives an account of the fumigation of rooms and ships which contain infection, by the vapours of the *acid of nitre*. He relies on this as a destroyer of putrid contagion, and as an agent whose sovereign efficacy is determined by facts which cannot be overthrown. The decision of Mr. T. on this point, we consider by far too positive and peremptory. It becomes him, and the gentlemen, many of them of the most respectable character in England, who

think as he does, to re-consider these boasted experiments on nitrous fumigation. We deliver it as our firm and solemn conviction, that these trials have been egregiously misunderstood and misinterpreted. They do not militate against the theory of Dr. Mitchill, as Mr. T. supposes, but, on the contrary, are capable of entire reconciliation with it. We shall not, however, go into the discussion in this place; but, instead thereof, refer our readers to vol. ii. p. 229 & seq.—to vol. iii. p. 200 & seq.—and to Mr. Carendeoffez's experiments on the constitution of nitrous and nitric acids, in vol. iii. p. 418, of the *Medical Repository*, where they will, we trust, find enough to satisfy them that this very fumigation with acid of nitre ought to be considered as a mistake or delusion in science.

On the cure of yellow fever, he enumerates, under different titles, quick-silver, venesection, emetics, cathartics, stimulants, alkalies and refrigerants, with some remarks from practical writers on each. Next follows the fourth and last section, which is filled with remarkable cases, to the amount of ten; of which, the one on the *spontaneous combustion* of the human body does not seem to us to have any particular connection either with plague or yellow fever.

The appendix to the volume contains several papers relative to pestilential distempers, some of which are quotations, and others abstracts, from different books. Of the former are, a description of the sickness of Athens during the Peloponnesian war, from Smith's translation of Thucydides—a remarkable case of a remitting fever at Bafforah, in 1780—and the queries furnished by Aikin and Jebb to Howard, and put, by him, to several physicians in the countries he visited, concerning the plague. Of the latter are, the account of the great plague in the time of Justinian, from Procopius—of the plague in London, in 1665, from Hodges and others—of the plague at Marseilles, in 1720, from the periodical publications of the time—and of the plague in Syria, Cyprus, and other parts of the east, from P. Russel's Treatise. We are willing to believe these abstracts are correct, though we have not compared them with the originals.

ART. III. *Transactions of the Society, instituted in the State of New-York, for the Promotion of Agriculture, Arts and Manufactures, Part iv. Published by order of the Society.*

[Continued from vol. iii. p. 389, and concluded.]

A NOTHER gentleman, whose pieces make a distinguished appearance in this volume, is Simeon De Witt, surveyor-general of the State of New-York. A sensible and well-composed address is prefixed to the other communications, which he delivered before the society in the assembly-chamber, in Albany, on the 20th February, 1799. From this piece we offer our readers Mr. D.'s remarks on the establishment of an agricultural garden for experiments (p. 15).

" Notwithstanding all the persuasives that can be employed to excite gentlemen, dispersed through the State, to bend their endeavours to the improvement of agriculture; notwithstanding the confessed importance of the subject, and the general consent that our wealth and greatness as a people must hence be derived; notwithstanding it be acknowledged that here is a field without bounds for the display of talents and taste, and that incentives from the most amiable passions of the heart urge us to it; I fear that we will not find the design of this institution fully executed, if we wholly rely on the efforts of its scattered members. We have, indeed, no reason to doubt that their contributions to the fund of experiments will be large and spirited; but they will be too heterogeneous, and not always such as will serve completely to demonstrate the facts most necessary to be proved. The only way by which we can systematically and effectually do our business, is by establishing an *experimental agricultural garden*. This, to us, will be the same thing that a laboratory is to the chemist. He, with his apparatus in his room, has dissected earth, air and water—chased nature through all her intricate flights, and formerly deemed inscrutable mazes—penetrated to her secret hiding places—explored her dark recesses—unlocked her cabinets—rifled them of her richest jewels—and filled the treasury of science. What would he, or could he have done, if his dependence for information had been altogether or chiefly on the labours of others? It is to be presumed that a cloud of darkness would yet enshroud that most useful and delightful of sciences. In the same manner an agricultural garden, properly conducted, might be made a little representative, a

miniature of the world, and furnish, in a short space of time, more facts relative to the history, nature, disposition, constitution, laws, government, and general economy of the republic of vegetables, than could, by any practicable means, be obtained from all America in a large portion of a century. Here exotics might be collected and naturalized—our wild, indigenous plants tamed, and their useful qualities investigated—every mode of culture tried, and the best accurately ascertained—experiments made of whatever promises fair in theory, or may lead to future discoveries and proofs of all those exhibited to the eye, so that no one should have occasion to risk anything by venturing on doubtful projects.

"This State, it must be confessed, does not unfold to the philosophic world a much admired feature in the portrait of America. By what institutions for the furtherance of useful knowledge, or by what extraordinary efforts of our citizens to advance the arts of peace, truly patriotic, have we distinguished ourselves? A university, colleges and academies, we have, it is true. They serve to save us from the shame of not following the fashion of nations. Nothing extraordinary can be placed to our credit on their account. What more have we to boast of? How few of our learned characters step aside, for a moment, from their professional employments, to show themselves interested in diffusing a taste for useful philosophy and works of ingenuity!"

A second communication, by the same hand, is on the methods of introducing heat into rooms and preventing its escape. This is the piece which is inserted at large in our vol. iii. p. 229; and to this we refer.

A third contributor of materials for this volume is Ezra L' Hommedieu, the Vice-President of the society. His essays are on the following subjects: 1. Observations on the smut of wheat, and the means of preventing it. This is principally an extract from Young's Annals, vol. x. p. 231; where it is stated, that arsenic, alkaline ley of wood-ashes, and lime-water, were the best preventatives of that disease. 2. On preserving mildewed wheat from injury—from Marshall's Gloucestershire, vol. ii. p. 54; where it is recommended to cut the crop as soon as it is struck by mildew, upon the principle that the sap or nutriment which is in the stalks of the wheat that is cut unripe, circulates to the ear, and fills the grain in the same manner it would have done had the stems remained upon their roots. 3. The method of curing diseases of fruit-trees, &c. This is merely a description of the receipt of Mr.

Forsyth, of Kensington; consisting of one bushel of fresh cow-dung, half a bushel of lime-rubbish of old buildings, half a bushel of wood-ashes, and one sixteenth of a bushel of pit or river sand, mixed together, and applied as a plaster. 4. Observations on the growth and nourishment of plants, by Mr. L'H. himself; wherein he adopts the opinion that *air* and *water* constitute the nutritive ingredients of plants. 5. On improving the breed of horned cattle, sheep and hogs. Mr. L'H. thinks the changing and crossing the breed of these animals a matter of great importance in husbandry, to prevent dwindling and degeneracy of the stock; and illustrates his doctrine by the experiments of Mr. Eaton and Mr. Clift, in New-York, and by extracts from the published sales by English farmers. 6. Method of distilling ardent spirit from potatoes, with observations—from the fourth volume of the Bath papers. The object is to show that seventy-two pounds of potatoes will afford five quarts of brandy, and, of course, that one hundred pounds, which Mr. L'H. supposes will amount to about two bushels, will make seven quarts, and be worth seven shillings. Whence he is led to ask, “Whether it would not be much for the interest of our *new* country to make brandy from potatoes rather than from wheat or rye, which are so much wanted by the new settlers, and will bear transportation to market, to enable the farmer to preserve the necessaries he wants? and whether it would not be better for our *old* settled country to make their spirits from potatoes rather than from apples, which would afford cyder, which is more wholesome and palatable than the spirits made from that fruit?”

We likewise observe several papers under the signature of Samuel L. Mitchill. They are as follow: viz. 1. Observations on canker-worms, a species of phalæna exceedingly injurious to orchards of apple-trees. The object of the writer is to show that the male only of this species of insect has wings, but that the female is apterous, and can only creep; that she ascends the trunk of the tree from the ground, as early in the spring as the 25th of March, and deposits her eggs upon the nascent leaves; and that the way to prevent their ravages would be to impede their progress as they crawl up to the branches. 2. On the providential or white-knobbed clover. This is a note, accompanying some clover seeds, received from England under that name, said to be a new species of trefoil. The trials made with it have not, that we have learned, shown that any advantage arises from the cultivation of it. 3. A sketch of the mineralogy of the State of

New-York. This is an abstract of the report which the Commissioner presented to the Society, after having made a tour, pursuant to their appointment, in 1796. The particulars of this may be much more completely and correctly seen in our vol. i. p. 293 and p. 445 first edit. and vol. iii. p. 325.

There are several other papers in this volume: as, 1. An account of some of the natural productions of the western parts of the State, by John W. Watkins. 2. On the effects of ever-green trees in augmenting the coldness of climates, by Noah Webster, jun. 3. On the cultivation of the poppy-plant for opium, and of palma christi for castor-oil, by Shadrach Ricketson. 4. On the effects of nitre and salt-petre in promoting the growth of corn and wheat, by Robert Johnson. This writer's directions are thus expressed:

"Take three ounces of salt-petre, bruise it fine, and dissolve it in as much soft or brook water as will immerse one half bushel of corn, to which add one pint of strong ley; steep the corn in this liquor, before planting, twenty hours, then spread it on a dry floor about five or six hours, when it will be fit to plant. I make no doubt but this treatment would be useful to seed wheat or other grain, and shall here relate an experiment I made about two years past. Late in the fall, a neighbour of mine being at my house, was lamenting that he had met with some embarrassment that had prevented him from sowing part of his crop of wheat in proper time: I told him, if he would follow my directions, I would engage the wheat he would now sow would be as forward in growth as what he had sown a fortnight past. He promised to follow whatever I would prescribe; and I gave him as much salt-petre as was sufficient for what wheat he had to sow, enjoining him, at the same time, to give me an accurate account of the success of his crop. About the time his wheat was fit to reap, he came and told me the wheat he had sown by my directions was on the same kind of ground his other wheat was sowed on—that it was sooner ripe—that it grew four inches longer than what he had sown early, and was at least 25 per cent. better."

5. Observations on marle, by the same. He informs the society, that in Essex and Sussex counties, in New-Jersey, there are good beds of marle, and that he is confident it may be found, in great abundance, in New-York. 6. An experimental essay on the properties of the gallium tinctorum, and its use in the art of dyeing, by Professor Woodhouse. 7. Description of a new-invented fire-place, by John Stevens

The book also contains the report of a committee appointed to report a plan for the preservation and propagation of trees; as wood for timber and fuel are becoming so alarmingly scarce; and a part of the representation made to the Legislature, on the best mode of salting and preparing beef for exportation, being the ground-work of the act relative to this subject, passed during the session of 1799.

ART. IV. A Treatise on the Nature, Origin and Progress of the Yellow Fever, with Observations on its Treatment; comprising an Account of the Disease in several of the Capitals of the United States; but more particularly as it has prevailed in Boston. By Samuel Brown, M. B. Boston. Manning and Loring. 8vo. pp. 112. 1800.

ON perusing this Treatise, we find it is a prize-dissertation, the subject of which was proposed by the Humane Society of Boston, and which we announced in our vol. iii. p. 413. That town, in common with all the other principal sea-ports of the United States, has been severely visited, of late, by pestilential diseases; and it gratifies us to observe, that its public-spirited inhabitants have not been idle spectators and sufferers of this calamity. The medical gentlemen of Boston have ably co-operated with their brethren in other parts of our country, in the investigation of this subject. In that town we are happy to recognize several distinguished physicians, who have not only meritoriously exerted themselves in this inquiry, but whose whole character does honour to their country and to their profession.

To the author of this Treatise, already favourably known to our readers by his attention to this subject (see our vol. ii. p. 390, first edit.), was adjudged, after careful deliberation, the premium of the Humane Society. The first part of the performance is chiefly devoted to the history of the disease, as it prevailed in Boston in the summer and autumn of 1798. The leading facts on this point were stated in the paper just referred to, and do not materially differ from such as have occurred in other places.

In tracing the causes of pestilential diseases, our author reviews many of the more prominent facts concerning the ope-

ration of marsh exhalations and human effluvia. For this purpose he states instances of the occurrence of such diseases in some of the most baneful climates in the world, where the relations of cause and effect are so evident and pointed as to preclude all doubt on the score of origin and locality. As to the constitution of this pestilential principle, he sets forth, and is inclined to adopt, the opinion of Dr. Mitchill, that it is formed by the different modifications of septic (azotic) and oxygenous matters evolved and chemically combined in the putrefaction of animal and vegetable substances. Conformably to this doctrine of the noxiousness of the acid of putrefaction, he mentions the salubrious properties of alkaline and calcareous substances, and of all the neutral salts whose alkaline bases may be seized by this stronger acid.

The treatment of this disease in Boston did not materially differ from that adopted in most other places. It is thus described, in general terms, by our author:

"The method of cure generally advised and pursued by the physicians here, was concisely this:—On the commencement of the disease, or in the first paroxysm, when there is great heat and convulsed motion of the heart and vessels, evacuate thoroughly and universally, by mercurial cathartics, by dia-phoresis, and by blood-letting: all these, with poultices, fomentations, pediluvium, bathing (cold and warm), blistering, enemas, &c. in such extent, variety, and continuance of application, as circumstances require. After one or two effectual cathartic evacuations, give mercurial pills, of one, two, or three grains, every one, two, or three hours, as symptoms shall indicate. Move the bowels with something cathartic, every, or every other day. *Drinks*—subacid, diluent, emollient. Continue thus till arterial commotion and heat subside, secretions and excretions are in some measure restored, and the signs of returning health appear: then use restoratives, viz. wine, bark, &c. *Food*—light and easy to the stomach, but generous and gently stimulating; in small quantities, and often."

Among preventative means, the author enumerates most of those regulations of police which have been so often urged, and so commonly neglected, or inadequately executed, in American cities. These suggestions are of great importance, and deserve to be reiterated on every proper occasion. But it is to be feared that a much longer lapse of time, and more accumulated experience of the ravages of such diseases, will be neces-

fary to induce our countrymen to adopt efficacious means of combating the effects arising from the infelicities of our climate, and from those peculiar local circumstances in which we especially differ from the regions of northern and western Europe. This is one of the many points in which the citizens of the United States are unwilling to detach themselves from transatlantic habits and prepossessions, and to conform to that system of duty and interest which nature and reason combine to impose.—The other directions which are given by our author concerning diet, and particularly the moderate use of animal food, as well as of distilled and fermented liquors, concerning personal cleanliness, dress, the regulations of exercise and labour, government of the passions, the avoiding of exposure to cold, night air, &c. &c. and likewise the preserving regularity of the intestinal discharges, are all so judicious and proper that we are confident they will be adopted by every reader.

Dr. Brown denies that yellow fever is originated or propagated by any specific contagion. After exhibiting many strong examples and authorities in support of this opinion, he proceeds thus:

" The facts and considerations already adduced, separate from what might be further observed, show, sufficiently clearly, that those only are rightly denominated contagious diseases which invade the constitution only once; which act, with almost equal effect, upon every variety of constitution, and temperament of body; which always bear the same type, and are invariable in their characteristic symptoms; and which are not changed, in these respects, by climate, or by any variety of atmosphere: but those diseases which are either sporadic or epidemic, according to the quantity and degree of heat, cold and moisture, or which vary with the states and conditions of the atmospheric elements; which are confined to particular complexions, constitutions and climates; which are capable of every degree of variation in type and symptom, from the mildest form up to the highest degree of malignancy; which invade the constitution an indefinite number of times, and with the greater malignity the oftener it has been attacked, are not specifically contagious; they may be called infectious, if by infection we understand the effluvia of putrescent substances, elevated by heat, and then denominated the gaseous oxyd of azote; or, combined with oxygen, forming septic acid gases. Inasmuch as these materials, thus produced, and diffused in the atmosphere, thereby destroy its salubrity, and occasion

such a depravity as to give rise to putrid diseases, either sporadic or epidemic; according to the locality or more general extent of the pestilential atmosphere, it is accurate to say that such diseases depend upon certain states or certain vicissitudes of the atmosphere, together with such other causes as produce debility in the constitution.

"The beneficial consequences which would result from a full and an implicit adoption of the doctrine above advanced, are numerous and important. In general, we should no longer find men wasting their time and ingenuity in insisting upon an ideal being, a *something* and a *nothing*, as the source of epidemic disease, and in tracing it from city to city, from continent to continent; which, when traced to where they *choose* to find it, will not allow it to be any thing obvious to the senses—cannot be known by any chemical test—is 'imperceptible,' &c. &c. On the contrary, we should see that the source of mischief might be among ourselves, and is the offspring, however monstrous, of our own vices; by these it is nurtured; the parentage and filiation is [*are*] wholly ours. We should be convinced, that there is not a city or town, in any climate, sea-port or inland, house or habitation in either, wherein malignant diseases may not originate. The regulations necessary to cleanliness, in doors and out, would be unremittingly attended to; and any thing that might tend to destroy the healthy temperament of the atmosphere, either generally or locally, would be immediately proscribed, by those vested with adequate authority."

We cannot conclude without expressing approbation of the disposal of the patronage and premium of the Humane Society of Boston, on this occasion, as worthy of an enlightened and patriotic association; and we recommend the perusal of the pamphlet to all who are desirous to see a brief and compact exhibition of some of the more important facts and authorities concerning this subject. The author displays the features of an inquisitive and discriminating mind. We hope he will continue to employ his researches in a course where so many interesting things are still to be learned, and where so many incentives are found to urge the pursuit.

ART. V. *Transactions of the American Philosophical Society, held at Philadelphia, for promoting useful Knowledge. Vol. iv. Philadelphia. Dobson. 4to. pp. 531. 1799.*

THIS volume presents to the public a continuation of the labours of the oldest association for promoting science in the new world. Founded principally by the enterprise, exertions and influence of Dr. Franklin, this Society has preserved, from the period of institution to the present moment, much of that zeal for the advancement of practical and substantial inquiries, as well as of sound learning in general, which distinguished the character of that illustrious citizen. The efforts since made, in some of the other States, to promote the same objects, may, perhaps, in part, be justly ascribed to the excitement and emulation originally inspired by the reputation and success which have invariably attended the career of the Philosophical Society at Philadelphia.

This ample volume contains seventy-six communications on a great variety of subjects. Though we have not confined our work to objects merely medical, nor even always to discussions usually supposed to bear relation to medical objects, we design, in the review of this volume, as its contents are so numerous as well as multifarious, to pursue a more restricted course, and to examine such papers only as claim the notice of professional readers.

The first paper consists of *experiments and observations relating to the analysis of atmospherical air, by the Rev. Dr. Priestley.* Two positions are attempted to be experimentally established in this paper: first, that, in what he calls the *phlogistication* of atmospherical air, there is not merely an absorption of one portion of it, to wit, the oxygenous portion, but that the phlogisticating material emits a somewhat which may be properly called phlogiston, or the principle of inflammability: and, secondly, that the basis of phlogisticated air, or azote, is composed of phlogiston and dephlogisticated air, and is not a simple substance, as the antiphlogistians contend to be the case in the present state of chemical knowledge.

In order to support the former of these positions, Dr. P. adduces the experiment of phlogisticating air by a mixture of iron filings and sulphur with a little water. Here hydrogen

gas, or sulphurated hydrogen gas, will be extricated. There is no doubt that iron, in the state in which it is commonly presented to us, contains hydrogen; it contains carbon also, more especially cast-iron, in which the quantity of carbon is considerable: of consequence, the antiphlogistians, in maintaining that iron and zinc are simple substances, undoubtedly run into error.—Dr. P. made another set of experiments with *calcined black bones*, by heating them in air confined over water, by means of a burning lens, till they became white. These bones gained no addition of weight; the air was diminished, and the remainder of it was completely phlogisticated. But it is surely not difficult to explain this on antiphlogistic principles. The pure air, by combining with the carbonic matter of the black bones, formed fixed air, which was absorbed by the water; while the whitened bones, by the absorption of water, and, perhaps, of some portion of the pure air, received a compensation for the weight lost by parting with their carbon. This seems to be proved by Dr. P.'s own acknowledgment, that "when these bones are heated over lime-water, there is a copious precipitation of the lime." The Dr. also admits, that "in these experiments with bones there is sometimes a small loss of weight." Similar results were observed from experiments made with small polished *steel needles*: for when they were heated so as only to become blue, and were not melted, they gained little, if any, weight, and diminished the air nearly in the same proportion as the black bones, leaving the remainder almost completely phlogisticated. The only way in which we can account for these experiments, is by supposing the steel to have been only slightly oxydated, and the remainder of the pure air, with the hydrogen of the steel, to have formed water.

To establish his second position, that phlogisticated air, or azote, is not a simple substance, but consists of phlogiston and dephlogisticated air, Dr. P. brings forward several experiments. He mentions a fact related by M. Metherie, that after a mixture of dephlogisticated and inflammable airs had been kept a long time, the mixture was found to contain a considerable portion of phlogisticated air. Dr. P. found, himself, that these two kinds of air unite completely by being confined some time together in a moist bladder. But the inference of union, in this case, seems not to be absolutely legitimate, when we recollect the experiment, made a long time ago by our author, to prove that dephlogisticated air may readily

pervade the coats of a moist bladder. Another argument in favour of the union of dephlogisticated and inflammable airs, in forming phlogisticated air, is drawn by Dr. P. from the experiment of producing the latter by exposing inflammable air to a surface of rusted iron, which is known to become so by imbibing pure air. In the course of this experiment, the iron, from being red, became of a very dark colour. It seems to us to be a more probable supposition, that the base of inflammable air, which we admit to enter into the ordinary constitution of iron, was, in this case, gradually absorbed by the iron, and that the remaining phlogisticated air was the result of azotic matter which had been entangled in the rust, or of the same matter introduced by the accidental and almost unavoidable impurity of the inflammable air.

The second paper, which also comes from the pen of the Rev. Dr. Priestley, is entitled, *Farther experiments relating to the generation of air from water.*

Having, in a former publication, delivered an account of some experiments made to prove that air may be produced from the same water, by means of heat and the Torricellian vacuum, without any perceivable limit, the learned author, in this communication, states the result of farther experiments, to throw light on the subject. He had not obtained from water, in the former set of experiments, any other kind of air than such as was, in a greater or less degree, purer than that of the atmosphere; and, therefore, he supposed that this might have been the source of all atmospheric air. But he has "since found, that though the first quantity of air that is expelled from water is much purer than that of the atmosphere, the next is less pure, and, at last, is wholly phlogisticated." It may be inferred from this fact, according to the opinion of our author, "either that the air produced from water is not that which had been imbibed from the atmosphere; or that, though it imbibes most readily that which is purest, it retains, with the greatest obstinacy, that which is least pure, which is analogous to other chemical affinities." With the view of carrying the experiments on this subject as far as possible, Dr. P. endeavoured to convert the whole of a small quantity of water into air, but without effect.

After the experiments thus made with water, our author proceeded to make similar ones with spirit of wine; and found that inflammable air is produced, without any limitation, as far as he could discover, from repetition of the process.

Dr. P. concludes his account of these experiments with the following observations: "The only objection that, after giving much attention to the subject, I think, can be made to the conclusion that I first drew from these experiments, viz. that air is actually produced from water, is the very small quantity that is produced in proportion to the bulk of the water, after the air naturally contained in it is wholly expelled. But if it shall appear, after a long course of time, that this small production of air, from the same water, is constant and equable, I do not see how the conclusion, extraordinary as it may be thought, can be disputed. This air being wholly *phlogisticated*, is a sufficient proof that the air so produced is not absorbed from the atmosphere in the course of the process: for then it would have been dephlogisticated, or, at least, purer than that of the atmosphere, which water always seizes upon in preference to that which is impure."

Dr. P.'s distinguished accuracy in conducting experiments scarcely allows the supposition of any material error from that source. And if we take his facts for granted, we cannot satisfactorily reconcile them to the constitution of water assigned by the antiphlogistic theory.

(*To be continued.*)



Medical and Philosophical News.

DOMESTIC.

WATER-WORKS IN THE CITY OF NEW-YORK.

THE Manhattan Company, incorporated by an act of the Legislature, passed April 2, 1799, for the purpose of supplying the city of New-York with pure and wholesome water, have already made great progress in that excellent work. The water, which is of a good quality, is raised, by means of forcing-pumps and the strength of horses, from a well on the side-hill in the rear of the debtor's prison. From the reservoir in its neighbourhood, which is on a high and commanding piece of ground, the water is conducted through bored pine logs to the different parts of the town. Already the principal streets are furnished with these aqueducts, which are laid about three feet below the pavement. Private houses are supplied with the water by a small leaden pipe, reaching from the main conduit to their cellar or kitchen; and the expense, both of this and of the supply of water by the year, is very moderate.—In passing from the reservoir to its places of consumption, it loses that extreme coldness which renders water fresh drawn from deep wells dangerous to be drunk in hot weather, and frequently destructive of life. We have not heard of an instance of any person killed, or even incommoded, in this way, by the Manhattan water. Besides the WATER, this company takes the lead in introducing CALCAREOUS MATERIALS, in the form of *lime-stone* and *marble*, for some of their works; and has already shown, that stone of this quality, from Hudson's River, can be obtained as cheap as the silicious *sand-stone* and *granite* heretofore generally in use.

CALCAREOUS STRATA IN THE NEIGHBOURHOOD OF NEW-YORK.

Dr. J. Browne, the superintendant of the water-works, has happily ascertained, that there is, in the county of Westchester, near the margin of the East-River or Sound, a considerable stratum of calcareous stone, well adapted for building and

flagging. It extends from Morrisiana many miles to the eastward, and is very accessible from a number of the principal landings. Some of the samples of the stone he has exhibited to the Manhattan Company, are of a white and granulated or crystallized structure, and susceptible of a handsome polish. It is estimated it may be brought to New-York, by a water-carriage not much further than Hell-Gate, upon very moderate terms. Among the means of guarding against pestilence in our cities, the introduction of calcareous stone is an object of great concern.

CHEAP METHOD OF MANUFACTURING SULPHATE OF SODA (*Glauber's Salt*).

By calcining sulphate of lime (gypsum) and muriate of soda (common salt) together, in a brisk heat, with the addition of clay, M. Carendessez has found that a double decomposition takes place in the dry way. The sulphuric acid joins the soda to form a Glauber's salt, while the muriatic acid connects itself with the basis of gypsum into a muriate of lime. The cheapness of *plaster of Paris* and of *sea-salt* seems to render this process economical, as from them both sulphuric acid and soda are very conveniently procured. And the clay employed to aid the decomposition adds very little to the expense.

BLEACHING OF MYRTLE-WAX.

Travellers in Africa give us particular accounts of the *tallow-tree* of that continent (*croton sebiferum*). The American soil produces a shrub (*myrica cerifera*) whence wax can be derived in considerable quantity, without the collecting and elaborating powers of the bee. Dr. Joseph Browne, of the city of New-York, has discovered a method of destroying the green colour of this substance, and of whitening it, without the aid of the oxygenated muriatic acid. The process is cheap and easy, and the candles made of it burn as well as those of spermaceti. The American woods afford great numbers of these wax-bearing shrubs, and the wax, when brought to market, sells for sixteen cents per pound, little more than the sum which tallow sells for. The lowness of its price prevents the exertions of the people of the country to collect the berries and extract their wax; in consequence of which many tons of this valuable natural production are annually lost. Should the ingenious inventor of this new process establish a manufactory for bleaching myrtle-wax, there would be a great

saving to the country, and the article, when purified and refined, would be as fit for plasters and ointments as for candles.

FOSSIL COAL ON THE RIVER LEHIGH.

A mine, affording coal of an excellent quality, has been opened, latterly, on the waters of the river Lehigh, in Pennsylvania. The place is said to be a little north of the gap in the Blue Mountains. This is a fortunate discovery, and it is to be hoped that future researches will detect that invaluable inflammable substance not only in Pennsylvania, but on the upper branches of the Susquehannah, in New-York.

LOCUSTS.

The following observations on locusts, made, in the year 1715, by the Rev. Andrew Sandel,* then rector of the Swedish church in Philadelphia, are left on the records of the said church, in the Swedish language, being, in exact translation, these:—"In the month of May a peculiar kind of grasshoppers or flies, called by the English *locusts*, issued from the earth. They came up every where, even on the hard roads. They were enabled to pierce the earth by means of a shell that covered the whole body, even the mouth and feet. Having issued from the earth, they crept out of their shells, flew about, placed themselves every where on the trees, and made a peculiar noise. As they were in great numbers over the whole country, their noise was so loud that the people could hardly hear the bells in the woods. They ripped the bark of the trees, and put worms therein. Many expected that the trees would be dried by this; but we found, next year, that it did not happen. Swine and fowls fed on these insects. The Indians did also eat them, especially on the first arrival, after a previous flight roasting: from this it is probable that they are of the same kind with those eaten by John the Baptist. They were of short continuance, dying in June."

Remarks. The worms mentioned were, no doubt, those white worm-like eggs which the present locusts deposit in the bark. All the other circumstances correspond with those that now take place.

That the locusts were not destructive, appears by the account given by the same author, on the extraordinary fertility of that year, in wheat, rye, Indian corn, oats, and apples.

* This is the man whom Linnæus quotes (in *Amænitat. Academ.*) in his hypothesis of fever, as affirming the co-existence of *intermitting fevers* and *argillaceous soils* in Pennsylvania.

That year was also remarkably healthy among the Swedes, as appears from the small number of deaths on the funeral records, which included a district at least fifteen miles north, west, and south from Philadelphia.

A great part of the little which is recorded on the natural history, seasons, diseases, &c. in the earlier times of Pennsylvania, New-Jersey, and the now Delaware State, we owe to the Swedish missionaries.

The Swedish congregation in Pennsylvania, owe also the principal part of their estate to the zeal and wisdom of the said Mr. Sandel.

NICHOLAS COLLIN,
Rector of the Swedish Churches,
Pennsylvania.

HISTORY OF THE TEA-PLANT.

We have received from Dr. Lettsom, of London, his *Natural History of the Tea-Tree*. It is a thin quarto, embellished with four most elegant representations of the green and bohea tea-plants; and of the *olea fragrans* and *camellia sasanqua*, which are sometimes employed to scent the teas; all coloured from nature.—The same liberal encourager and promoter of natural knowledge has likewise sent us the third edition of his *Naturalist's and Traveller's Companion*, a moderate octavo volume, full of excellent practical directions to the young inquirer.

AMERICAN GEOGRAPHY.

C. D. Ebeling, Professor of History, and Keeper of the Public Library in Hamburg, whose fourth volume of American Geography, in the German tongue, we mentioned in Med. Rep. vol. ii. p. 439, has published a fifth. It is a large octavo of more than eight hundred pages, and comprehends his account of the States of Delaware and Maryland. We cannot discover any diminution of the industry and talents displayed in the former parts of this laborious and interesting work. Convinced of the utility of communicating to European writers a true state of things as they exist in America, we again express our hope, that the gentlemen of the United States who have leisure and opportunities, will aid Mr. Ebeling in his laudable undertaking, so that the accounts printed in the eastern hemisphere, concerning the present condition of the western, may be correct and authentic.

CHURCHMAN'S MAGNETIC ATLAS.

We understand that a third edition of *The Magnetic Atlas*, with important improvements, is now preparing for the press, and proposed soon to be published.

It seems this new work is much simplified, and intended to show, by inspection, at a single view, the magnetic variation, on the different parts of the globe, for the commencement of the new century, so necessary to be known and allowed for by every navigator and land-surveyor, demonstrated on the same projection as the former edition, with the addition of curve lines drawn through the different places where the variation is equal, thereby avoiding the trouble and difficulty of measuring angles. To render it as perfect as possible, Mr. Churchman, the author, has been engaged in making observations of the magnetic variation at different places on our coast, in order that the same may be applied to the purpose of ascertaining the longitude at sea; and the recent experiments prove the possibility of making observations with more accuracy than was apprehended, even by some eminent navigators.

FATAL EFFECTS OF PUTRID EFFLUVIA.

A gentleman from the western parts of the State of New-York, informs that a fever appeared in the township of Franklin, near the Pennsylvania line, in the month of March last year, which carried off thirty-eight persons, many of whom, Dr. Brett, who is one of the judges of the common pleas court of Delaware county, in the State of New-York, and was the physician who attended them, says, died with hæmorrhages and the black vomiting. He says the other symptoms of this fever agreed with the descriptions which have been given of the autumnal malignant fever of our sea-ports. The same gentleman informs us, that a similar fever appeared in Luzerne county, in the family of John Hawley, in June last, and that five of that family died with it. After the death of those persons a quantity of putrid potatoes were discovered in the cellar of Mr. Hawley, and to the effluvia emitted by them the fever was ascribed. During the existence of this fever, a fatal disease prevailed among the wild pigeons and swine in Luzerne county. Upon examining the bodies of the pigeons after death, a swelling was discovered in their throats, so great as to obstruct their swallowing. In the gullets of some of them beech nuts were found sticking between the stomach and the mouth.

YELLOW FEVER IN THE WESTERN COUNTRY.

The following Extract from Mr. Andrew Ellicott's Voyage down the River Ohio, in the Month of November, 1796, is calculated to throw much Light upon the Origin of the Yellow Fever.

“ November 15th.

“ Arrived at Galliopolis about 11 o'clock in the morning.—This village is a few miles below the mouth of the Great Kanhaway, on the west side of the Ohio river, and situated on a high bank; it is inhabited by a number of miserable French families. Many of the inhabitants, this season, fell victims to the yellow fever. The mortal cases were generally attended with the black vomiting. This disorder certainly originated in the town, and, in all probability, from the filthiness of the inhabitants, added to an unusual quantity of animal and vegetable putrefaction in a number of small ponds and marshes within the village.

“ The fever could not have been taken there from the Atlantic States, as my boat was the first that descended the river after the fall of the waters in the spring: neither could it have been taken from New-Orleans, as there is no communication, at that season of the year, up the river, from the latter to the former of those places: moreover, the distance is so great, that a boat would not have time to ascend the river, after the disorder appeared that year in New-Orleans, before the winter would set in.”

The following Fact is communicated by Dr. Watkins, from his personal Knowledge.

There is a village called New-Design, about fifteen miles from the Mississippi, and twenty miles from St. Louis, containing about forty houses and two hundred souls. It is on high ground, but surrounded by ponds. In 1797 the yellow fever carried off fifty-seven of the inhabitants, or more than a fourth. No person had arrived at that village from any part of the country where this fever had prevailed, for more than twelve months preceding. Our informant resided in the village at the time; and, having seen the disease in Philadelphia, he declares it to be the same that prevailed at New-Design. He also mentions an Indian village depopulated by the same disease two or three years before.

Fever, with black vomiting, in the Middle Part of Pennsylvania, west of the Susquehannah. From a Communication of Dr. W. Harris to Dr. Mitchill.

" June 23, 1800.

" The fever which prevailed, in the autumn and winter of 1799, in Nittany and Bald-Eagle Valley, in Mifflin county, Pennsylvania, proved, in a number of cases, mortal. Bald-Eagle Valley, situated about 200 miles N. N. W. of Philadelphia, is low, abounding with much stagnated water in ponds, which, from the dryness of the season, became very putrid and offensive to the smell. Near to these waters the fever prevailed with great malignity. It was ushered in by chills, with pains in the back, limbs and head, which, in 48 or 60 hours, carried off the patients. They discharged vast quantities of filth from the stomach, of the consistence and appearance of coffee-grounds, so offensive in smell as to produce nausea, and even vomiting, in the attendants. The faeces also had the same appearance. In many the disease terminated by profuse discharges of blood from the anus and vagina. Bleeding, in these cases, appeared to afford no relief. The bark and tonics, with the liberal use of alkalies, were of the utmost service."

CHEMICAL EXPERIMENTS ON THE MATTER OF BLACK VOMIT.

A memoir on the analysis of black vomit, by Dr. Cathrall, was read before the American Philosophical Society at Philadelphia, on June 20th, 1800. This is a very interesting and instructive paper. The experienced and intrepid author has given a description of the black vomit, has analyzed the fluids ejected a few hours before the commencement of black vomiting, and exhibited a set of experiments on the matter of black vomit itself: to which he has added, experiments to ascertain the effects of black vomit on the living system of man and other animals, and a synopsis of the opinions of authors concerning its formation and qualities. The experiments show that this singular morbid excretion contains an acid, which is neither carbonic, phosphoric, nor sulphuric; and, what our readers will hardly expect, that the black vomit may be smelled, tasted, and swallowed, without inducing yellow fever, or even any sickness at all—so little infection or contagion does it seem

to contain! He concludes it to be an altered secretion from the liver. Of these memorable experiments, which do great honour to Dr. Cathrall, we shall give a particular account in our next number.

A Case of Tetanus cured by the Cold Bath: In a Letter to Dr. R. H. Archer, of Baltimore, by Dr. William Harris, of Pennsylvania.

SIR,

In the autumn of 1799, I visited a labourer, about thirty years of age, of a slender make, but healthy, who was suddenly seized, whilst in bed, with spasms in his lower extremities, which shortly after affected his whole system, but particularly his stomach, which was drawn in a hard lump, and protruded to a considerable distance. His pains were excruciating. He had a violent vomiting and purging, which came on an hour after seizure, and continued about two hours. At one time he had emprosthotonus, at another opisthotonus, to the greatest degree, and sometimes complete tetanus. The muscles of his face were drawn in every direction, and deglutition entirely impeded. His pulse varied much, but was generally feeble. He could assign no cause for the attack. I bled him, put him in the warm bath, and used all the remedies laid down by medical writers, but without any mitigation of his pains, or relief to his spasms.

At this time, which was twenty hours after the attack, when the cold sweat of death appeared to be upon him, his tongue had refused its office, his eyes sunk, having a glassy appearance, and his exit was every moment expected, it occurred to me that the cold bath might have a good effect; and, after consulting his friends, who readily acquiesced, I had him, in this state, carried in a blanket to a forge dam which was at hand, and plunged in. He was then insensible. His spasms immediately abated, and, in twenty minutes, totally ceased. The debility induced by muscular exertion was such that it required several days before he could be removed; after which he rapidly recovered, and is at this time perfectly well.

This was a complete tetanus; and, I think, tetanus from wounds, &c. would yield to the same mode of treatment.

Belle-Font, June 12, 1800.

CASE OF HYDROPHOBIA.

Died at Scarborough, on the 20th of June, of canine madness, a son of Mr. Enoch Berry, aged ten years. This boy was bitten in April last by a cat, which, at the time, was supposed to be affected with canine madness, and was immediately killed on that account.—The wound was perfectly healed in a few days, and the boy was apparently well till last Tuesday, when he complained of the wounded hand's pain-ing him. The symptoms of madness soon after began. He refused all food except apples, which he bit at and ate without touching them with his hands. Water was then offered him, and the physician ordered it poured out before him; but he turned from it with disgust, and was greatly agitated when he saw it. He tried to bite every thing which came in his way, and once fastened his teeth on his father's arm, took out a piece of the sleeve of his coat and shirt, but fortunately did not touch the flesh. He had his senses perfectly at intervals, knew his friends, but was all the time in the greatest agonies. There were no great variations in the symptoms, excepting that they grew stronger, and his horror became more extreme until Friday evening, when he expired in the most excruciating tortures.

TREATMENT OF LOCKED-JAW BY ELECTRICITY.

Dr. Samuel Perry, of New-Bedford, has communicated to the public the successful result of two experiments, in curing the locked-jaw by means of electricity. Previous to the application of the electrical fluid, recourse had been had to bleeding, cathartics, antispasmodics, the warm bath, and opium applied internally and externally, without the least effect in either case. But a small receiver being filled, and discharged through the jaws of the persons affected, they flew open instantaneously. In one case the complaint was entirely removed by three shocks, in the other by an occasional shock for a few days. Both the patients were strong and healthy persons, the one a man and the other a woman, and the mode of treating them had been similar.

INFORMATION FOR AMERICAN BOTANISTS.

Professor Wildenow, of Berlin, in a letter to Dr. Mitchell, of March 1, 1800, offers to exchange the *seeds and dried plants* of Europe for those of America. To the botanists of the United States, an overture of this kind, from a person of so much reputation and experience, promises numerous ad-

vantages. This learned gentleman is now engaged in editing a new edition of Linnè's Species Plantarum, to include the newly-discovered plants.

MINERALOGICAL SOCIETY OF JENA.

The Mineralogical Society of Jena, in Saxony, have lately elected an inhabitant of New-York, Mr. Charles Los, a member of their association. Its president is the Count Von Seck, and its director Professor Lenz. The number of members, in its catalogue, is two hundred and seventy-five.

MEDICAL COMMENCEMENT IN PHILADELPHIA.

At the medical commencement, held in the city of Philadelphia, on the 31st of May, 1800, the University of Pennsylvania conferred the degree of Doctor of Medicine on ten candidates. Their names, with the titles of their inaugural dissertations, were as follow: to wit,

Joseph Trent, of Richmond, in Virginia—An Inquiry into the Effects of Light in Respiration.

Robert Berkeley, of Virginia—An Inquiry into the Modus Operandi of that Class of Medicines called Sedatives.

Edward Darrell Smith, of Charleston, South-Carolina—An Attempt to prove that certain Substances are conveyed, unchanged, into the Circulation; or, if changed, that they are recomposed, and regain their active Properties.

James Agnew, of Princeton, New-Jersey—On Perspiration.

John Parker Gough, of Charleston, South-Carolina—Essay on Cantharides.

Alexander May, of Pennsylvania—On the Unity of Disease, as opposed to Nosology.

John Baptiste Clement Rousseau, of Hispaniola—On Absorption.

Joseph Glover, of Charleston, South-Carolina—An Attempt to prove that Digestion in Man depends on the united Causes of Solution and Fermentation.

John Moore, of Pennsylvania—On Digitalis Purpurea, or Fox-Glove.

Frederick Seip, of Philadelphia—On Cataract.

MEDICAL LECTURES IN COLUMBIA COLLEGE.

The annual courses of medical lectures in Columbia College, and in the New-York Hospital, will commence, as usual, on the second Monday of November.

COW-POX.

Dr. Pearson, of London, has obligingly transmitted, in a letter to Dr. Miller, another thread impregnated with the matter of the vaccine pock, for the purpose of making trial of this substitute for the small-pox in the United States. Dr. Pearson also communicates the following articles of intelligence:

1. Mr. Carlisle's discovery of the singular arterial structure of the tardigradus animals, or floth.
2. Herschel's beautiful experiments on the distinction between solar light and solar heat, and terrestrial heat and terrestrial light.
3. Mr. Howard's fulminating mercury.
4. The use of plaster of Paris three parts, and one part of starch or flour, made into paste, to be used in calico-printing, book-binding, &c. instead of common starch.
5. The use of muriate of lime with ice, by the confectioners, to produce much firmer and colder frozen cream than with common salt and ice.
6. Citric acid is now manufactured, in a concrete state, by Coxwell, and is as cheap as acid of tartar.
7. Carbonate of vegetable alkali is now manufactured in a crystallized state, and it is permanent in the air because it is alkali saturated with carbonic acid.
8. Volta's galvanic battery, by which shocks can be given, and even water be decompounded.

In a letter to Dr. Hofack, communicated to Dr. Miller, Dr. Pearson more particularly describes this discovery of Signor Volta as follows:

"Volta has demonstrated the galvanic influence by the following experiment:—Take a number of plates of zinc and silver of the same figure—say crown pieces—place them alternately on one another, with wetted paste-board between each, so as to form a column. Then touch the bottom with a piece of iron or other metal well wetted, and the hand wetted—and the top of the column must be touched at the same time in like manner, by which you will feel a shock of electricity. Another proof is beautiful. Place on the side of the column a tube half an inch wide, filled with water, and stopp'd at each end with a cork—thrust a wire through the upper cork to the middle of the tube, and another wire, in like manner, through the under cork, within half an inch of the point of the upper wire—and place the tube of water so armed on the side of the column of metal plates, to communicate by wire with the top and bottom. Thus you will see presently

a stream of air-bubbles rising from the ends of the wire in the water, and ascending to the top, which will be found to be hydrogen gas, if iron be used, and which will be oxydated at the point from which the gas rises—but if gold, or platina, or silver be used for wire, the gas will be a mixture of hydrogen and oxygen gas, the water being decompounded. This you will understand from the nature of the metals used.”

BURNS AND SCALDS.

We find some difference of opinion now exists among British surgeons, concerning the best mode of treating burns and scalds. Mr. Earle, of London, has just published an essay upon this subject, in which he recommends the immediate application of cold water, or water made colder by ice, which is to be renewed as often as it becomes warm. The cuticle of the burnt or scalded part is not to be removed, and all stimulant and oily applications are to be avoided. By these means, he asserts, the cure will be accomplished, without leaving scars or lameness of the part. The sooner the ice is applied, after the accident has happened, the better.—Mr. Earle's eminent character will, doubtless, operate powerfully, with many, in favour of his plan of treatment.

On the other hand, Mr. Kentish, of New-Castle upon Tyne, strongly advises the application of spirit of turpentine to burns and scalds as soon as possible; which he thinks the best adapted to promote a rapid suppuration, and to prevent the irregular marks and seams commonly following other modes of treatment. Many respectable surgeons adopt this remedy.—A case of severe scald is stated by Mr. Bell, of the British navy, in which the affected parts were copiously bathed with *ol. terebinth.* previously warmed by putting the phial into hot water; afterwards slips of linen, spread with *ungt. ceræ*, were applied. The pain was removed very speedily, and the patient fell asleep. The dressings of *ungt. ceræ* were only continued for a short time: the affected parts were then dusted with hair-powder, which formed a scab that fell off in the course of a few days, leaving the skin underneath perfectly sound.

DIGITALIS PURPUREA.

It appears, by the late medical publications in Great-Britain, that the inquiries concerning the powers and effects of digitalis in pulmonary consumption, and in many other diseases, continue to be prosecuted with great zeal in that island. Though unanimity is far from prevailing, almost all practitioners al-

low that it is one of the most active of medicinal agents, and that the cautious use of it may be safely adopted. So many instances of its complete efficacy in the early stages of consumption are adduced, and such proof, likewise, of its alleviating, for a time, the distressful symptoms incident to the last and fatal stage, that we should hold ourselves culpable in neglecting the notice of them: It must be confessed, also, that examples of the deleterious qualities of digitalis are not wanting; especially where it is exhibited at first in too large doses, where they are advanced too rapidly, and where the use of it is continued after the appearance of violent effects. Much disquisition has arisen concerning the best mode of preparing this substance for use. A general preference of the recent herb seems to prevail; and the tincture, decoction and infusion, particularly the first, are chosen rather than the powder. The nauseating effects of it, instead of being sought after as the source of benefit, are avoided, by many of the experienced employers of it, as the harbingers of ill. The retardation of the pulse is not always considered as essential to its efficacy; but the change from hard, weak and small, to soft, firm and full, is constantly conducive to recovery. Together with the use of digitalis, it is commonly enjoined to abstain, as far as possible, from liquids, and to take small quantities of solid animal food, at short intervals. It is asserted that portions of beef, mutton or pork, not exceeding one ounce at a time, rather under dressed, well masticated, and repeated about every two hours until six o'clock in the evening, then discontinuing the course, and resuming it at about eight the following morning, will prove, in every stage of pulmonary consumption, more strengthening and salutary than the modes of nourishment commonly prescribed. It has been also plausibly proposed to confine consumptive patients to a diet of *animal food* and *cream* exclusively.

It appears, also, that the use of digitalis has been successfully extended to the treatment of insanity, strangulated hernia, hydrocephalus internus, &c.

IMMUNITY OF HOLLAND FROM THE PLAGUE.

The learned Dr. Blane, in a letter addressed to Sir Johti Hippisley, member of the committee of quarantine of the Turkey Company, and in answer to certain queries propounded by the Turkey Company, informs us that the Dutch, the most commercial and cleanly nation in Europe, for a long time past, have been singularly careless of the means of excluding

pestilential diseases; and yet they have been exempt from the plague for upwards of an hundred and thirty years. They were accustomed to import from the Levant, for the British market and their own, cargoes of unpurified raw materials, particularly cotton; and all this was done without contagion. They have no kind of lazarettoes: they make little, if any, distinction, between clean and foul bills: and their pretensions of quarantine are mere empty forms, nugatory and insufficient to destroy contagion, if contagion had adhered to their merchandize.

See Blane's *Observations on the Diseases of Seamen*, 3d edit. p. 616 and 621. See also the remarks upon the means of cleansing ships, and thereby preventing the generation of pestilential poison, in the answer of the general committee of the citizens of New-York to the citizens of Philadelphia, in our vol. ii. p. 360 and 361, first edit.

FRENCH INSTITUTE AT CAIRO.

A translation of the memoirs relative to Egypt, written in that country, during the campaigns of Gen. Bonaparte, in the years 1798 and 1799, by the learned and scientific men who accompanied the French expedition, has been published in London by Mr. Phillips, in an octavo of more than four hundred and fifty pages, and just received in this city. The pieces are miscellaneous. Among others we remark, in Gen. Andreaossi's report upon the salt-petre and gun-powder of the country, that the septeite of pot-ash is *found ready formed in the earth*, on the road from New to Old Cairo; while in France they are usually obliged to obtain the nitre with an earthy basis, by means of a ley, which is afterwards converted into salt-petre by means of pot-ash, imported from foreign countries, and bought at a high price (p. 39).—Bruant, physician in ordinary to the army, mentions, as Prosper Alpinus had done before, the sore *ophthalmia* of Egypt (p. 111), and ascribes it to a concurrence of external and internal causes: among the former is the scorching *nitrous dust*, which the winds are constantly raising in clouds into the atmosphere; among the latter, as Desgenettes, the Physician-General observes (p. 62) it is symptomatic of diarrhoeas and dysenteries.—Berthollet, who visited the six lakes of natron or soda to the westward of the Nile, is convinced that the mineral alkali found in them is produced by a decomposition of the *muriate of soda*, or *common salt*, with which the waters are naturally impregnated: that this decomposition is effected by the *carbonate of lime*, or *common calcareous rock*, which forms the strata of subjacent soil in those places, in the moist way; and that, by a double elective at-

fraction; the muriate of soda and carbonate of lime are changed to a muriate of lime and a carbonate of soda (p. 308).— Berthollet also, in a valuable paper on eudiometry (p. 317), delivers it as the result of his experiments, made both at Cairo and Paris, that the portion of oxygenous gas in the atmosphere is about the same at both places, and that this is somewhat less than twenty-two parts in the hundred, a considerably smaller proportion than most experimenters had hitherto calculated.—Regnault has made an analysis of the *slime of the Nile* (p. 388), which he finds to consist of eleven parts of water, nine of carbon, six of oxyd of iron, four of silex, four of carbonate of magnesia, eighteen of carbonate of lime, and forty-eight of alumine, in the hundred. It is an excellent manure.—There is a piece, too, by Desgenettes (p. 358), on the *use of oil in the plague*, confirming its salutary operation, and showing, contrary to the most current opinions *a priori*, that friction with it does not obstruct, but open the cutaneous pores, and thereby increases perspiration prodigiously. But for further information we must refer to the book itself.

LETTERS FROM IRELAND.

Dr. William Patterson, of Londonderry, in a letter to Dr. Miller, has been so obliging as to enclose a printed copy of two letters, one from Dr. William Drennan, of Dublin, the other from himself, addressed to Joseph Wilson, Esq. American Consul, on the subject of yellow fever. We are sorry our limits do not allow us to re-publish these letters in the present number. These estimable gentlemen certainly manifest the most benevolent wishes for the deliverance of America from pestilential diseases, and a warm and active spirit of philanthropy. But they do not seem to have taken the requisite pains to obtain information on a subject which calls forth all the fervour of their zeal, and all the tenderness of their commiseration.

The opinions of Dr. Drennan are evidently predicated on the *specific and permanent contagiousness*, and those of Dr. Patterson on the *importation* of the yellow fever. These opinions reciprocally depend upon each other, and, of consequence, must stand or fall together. This is neither the proper time nor place to enter fully into such a discussion. If medical gentlemen are determined to consider a disease as specifically contagious, merely because it affects many people at the same time, they may find examples of such contagion in

the intermittents of a marsh, in the pneumonia and phthisis of winter, or in the gastritis of a convivial circle, whose viands are converted into poison by the admixture of arsenic. It gives us pain to see such respectable physicians precipitately rushing into conclusions altogether unwarranted by the premises. If they read the latest and best performances of British physicians on the diseases of the West-Indies, they will find that the yellow fever is not a contagious distemper. Every merchant and planter in those islands knows this fact. We assert that it is as little contagious in the United States. It only prevails within certain local ranges of air contaminated by the effluvia of animal and vegetable putrefaction; and, beyond these limits, is incapable of propagation.* Multitudes take the disease in our cities who never approach the sick, the suspected vessels, or any fomites supposed to be imbued with contagion. The only possible mode of accounting for these cases, is to ascribe the illness to the patient's immersion in an atmosphere greatly viti- ated throughout certain definite portions. Our present number affords several authentic instances of the same pestilential dis- temper in the interior of our country, where importation was impossible, and where local circumstances completely solve the difficulty. Dr. Drennan's plan of extinguishing the disease by high artificial heat would not succeed unless applied to a whole city, which he will grant to be impracticable; and Dr. Patterson's doctrine of importation is insufficient to explain the ravages of yellow fever at Galliopolis, and at Bald-Eagle Valley, in Pennsylvania, and at many other places.

These gentlemen seem to be surprised that so little has been attempted by public authority, and so little accomplished by the medical profession in the United States. But to infer im-becility in the government, or incapacity among physicians, because the havock of yellow fever has not been arrested, is, in our judgment, to take a narrow view of the subject. The devastation of pestilence forms a mournful page in the his-

* In asserting that the yellow fever is not contagious, let us be explicitly understood. We do not deny that the excretions of the sick, in this disease, where cleanliness is not duly observed, may assist, like any other kind of animal putridity, in the formation of pestilential matter. But we contend that this is not more likely to happen from the effluvia of a patient in yellow fever, than from the effluvia of one labouring under any other fever, or from the putrid vapours emitted by a gangrenous ulcer, or by a heap of dead and putrefying animal and vegetable substances, under similar conditions of a hot, moist, and otherwise insalubrious atmosphere. How far this differs from the constitution of specific contagion, such as that of small-pox and measles, every reader will be able to judge.

tory of every age and nation. It is to be lamented that American skill should be in any degree baffled; but surely it is not without accumulated precedents. The energies of government, aided by all the wisdom of the illustrious Sydenham and Morton, were insufficient to stay the destruction of the plague in London in 1665. All the learning, diligence and zeal of the physicians of his Britannic Majesty's forces in the West-Indies, have not prevented those islands from continuing to be the grave of Europeans. And, if we are not misinformed, the mortality of scarlatina anginosa, in some parts of England, has lately extended to nearly one-fourth of those who were attacked, notwithstanding all the splendid improvements of medical science in Great-Britain.

While we thus freely animadvert upon the opinions of these gentlemen, we cannot forbear to repeat our high respect for their talents, as well as their motives on this occasion; and we shall be extremely happy to receive their further communications on the subject.

FOREIGN.

USE OF POT-ASH IN PUERPERAL FEVERS.

CITIZEN GUINOT, in a memoir inserted in the xxxvii. number of the "Recueil Periodique de la Société de Médecine de Paris," recommends, in strong terms, from his own experience, as well as that of others, the use of the carbonate of pot-ash (fixed vegetable alkali) in puerperal fevers. This medicine is employed as a preservative against the invasion of these fevers, as well as in the treatment of them, from ten to thirty-six grains in the course of a day. He also recommends the prudent use of ammonia for the purification of the air.

USE OF POT-ASH IN FISTULA LACHRYMALIS.

Citizen Pajot des Charmes read an essay on the effect of alkaline substances employed in the treatment of *fistulae lachrymales*. He was induced to report his experiments on this subject, in consequence of his having observed, that the use of a piece of linen, newly washed, and thus saturated with an alkaline ley, after several applications, effectually relieved

the symptoms of that disease. This simple method, according to his experience, uniformly and perfectly removed the complaint.

See Medical and Physical Journal.

NITROUS, NITRIC, AND OTHER ACIDS, IN SYPHILIS.

Mr. Blair, surgeon of the Lock-Hospital and Asylum, &c., in a late work, entitled "Essays on the Venereal Disease and its Concomitant Affections," &c. second part, delivers the following opinions concerning the powers of the acid remedies in that disease.

His general inference is, that the new remedies cannot be relied upon for the radical cure of the secondary symptoms of syphilis; but that the nitrous or nitric acid, given in conjunction, or alternately with mercury, may be highly useful in promoting the cure. He closes his work with the following conclusions:

1. Dyspeptic and debilitated venereal patients, if they be not hectic, almost certainly receive benefit from the daily use of the acids, in conjunction, or given alternately with mercury. They not only have their general strength and appetite improved, but are also enabled to bear the proper quantity of mercury much better than when it is administered alone.

2. In erysipelatous, phagedenic, languid, fistulous, and irritable ulcers, where no venereal infection exists, and where mercury would probably do harm, the diluted acids are sometimes astonishingly efficacious, employed externally as well as internally.

3. Old chronic pains and tumors in the bones, ligaments, and membranous parts, have been alleviated by the internal use of the new remedies; especially when these symptoms arose from the mal-administration of mercury.

4. The nitric lotion is often serviceable in cases of excoriated glans or prepuce, &c. accompanied with a puriform discharge, where the degree of swelling, pain, and inflammation is inconsiderable; but the common saturnine wash appears to be equally beneficial, and has the advantage of never increasing the inflammatory symptoms.

5. Gonorrhœa and leucorrhœa may now and then be removed by the acids, employed internally, or by injection; but they often will produce a troublesome dysuria, and are not so certain in arresting those discharges as the common means of cure.

6. Buboës tending to suppuration, and indurated lymphatic glands, have sometimes been dispersed by these medicines; but in this respect likewise they are inferior to other modes of treatment.

7. Although the result of my own experience has not encouraged me to persist in the use of M. Alyon's "oxygenated lard," several practitioners in London have composed an ointment (impregnated with nitrous acid) which is highly serviceable in herpetic, impetiginous, and itchy eruptions. In such cases I have repeatedly seen good effects from the nitric mixture and lotion.

8. Most of the local inconveniences which arise from an incautious use of mercury, such as ulcerated cheeks, swelled tongue, spongy gums, loose teeth, fetid breath and profuse salivation, however paradoxical it may seem, have been more speedily and effectually relieved by the internal exhibition of the acids, than by any other medical treatment hitherto employed; so that, for these purposes, I now trust to them confidently, and almost exclusively.

9. Under no circumstances of disease, or peculiarity of constitution, has the oxygenated muriate of pot-ash appeared to me preferable to the acids: but, on the contrary, the latter have proved much more beneficial, and less injurious to the system, than the former. This remark, perhaps, will hold equally true of the oxygen gas; respecting which, however, the evidence is at present too defective to ground any solid conclusions upon. I think, also, that very little reliance can be placed on the nitric acid bath, except for some cutaneous affections.

10. I have never derived any manifest advantage from increasing the daily quantity of the acids to more than two drachms; and, in common, I find one measured drachm sufficient—either diluted in plain water, or qualified with syrup, opium, or ardent spirits. For a lotion or injection, I mix from twenty to sixty drops of the concentrated acid with a pint of pure water.

11. Of all the different acids, I have seen most benefit from the nitrous or nitric. The latter is more palatable, though not more efficacious, than the former: but, in certain constitutions, none of the acids will agree; and, in some cases, especially where considerable inflammation exists, it is highly improper to exhibit them. When they did not speedily improve the appetite, and afford an increase of vigour, I have

seldom seen any future benefit to the general health from their continued exhibition.

12. Where the "saline anti-syphilitics," as they are called, have disagreed, some of the following unpleasant consequences ensued: viz. violent nausea, vomiting, flatulency, cardialgia, eroding pains in the stomach, diarrhoea, dysentery, obstinate constipation, heat in the bowels, constant itching of the skin, miliary eruptions, universal tremor, frequent cold shivering, extreme giddiness, throbbing in the head, disordered intellect, erethismus, irregular palpitation of the heart, intermitting and quick pulse, dyspnoea, ardor urinæ, forcing pain of the uterus, diminished or suppressed secretion of bile, spitting of blood, hæmorrhage from the nose, ophthalmia, and phlogistic diathesis; to which may be added (in some few examples) an injurious effect on the enamel of the teeth, inflamed lips, swelled cheeks, deep ulcers of the tongue, and copious ptyalism.

13. I regard the chemical explanation which has generally been given of the *modus operandi* of the new remedies, and of mercury in the venereal disease, as entirely hypothetical. But whatever be their respective mode of action, their sensible effects are not strictly analogous to each other: for the salivation now and then arising from the free use of the acids, is very different from a mercurial ptyalism, being unaccompanied with looseness of the teeth, spongy gums, or foetid breath: and their constitutional effects, in many particulars, seem of an opposite nature from those which are experienced by a long continued course of mercury.

INOCULATION OF THE VACCINE POCK.

The progress of the vaccine disease in Great-Britain, for some time past, has been such as to afford ground for the expectation of its universal adoption. An institution for the inoculation of it was founded in London, on the 2d December, 1799. It does not appear that the vaccine pock can be propagated, like the small-pox, by effluvia from persons labouring under it, nor indirectly from diseased persons, by adhering to clothes, furniture, bedding, letters, &c. Persons who have undergone the vaccine disease are found to be thereafter unsusceptible of the same disorder; and such as have already gone through the small-pox are not susceptible of the vaccine disorder, as was believed some time ago. The slightness and safety of the vaccine pock are now ascertained from the reports of many practitioners; and, as it does not

appear that more than one out of 6000 has died under the new practice, it seems not unreasonable to infer, that the chance of life is, perhaps, greater during the inoculation than under the ordinary circumstances to which human beings are exposed.

CURE OF OPHTHALMIA BY SPIRITS OF TURPENTINE.

Dr. Matthew Guthrie, of St. Petersburg, in Russia, in a letter to Dr. Duncan, mentions the remarkable efficacy of the effluvia of spirits of turpentine in the cure of an old and obstinate case of ophthalmia, which had resisted all the common remedies. It was discovered by accident. The patient, an eminent artist, whose disease had arisen from a too assiduous employment of his eyes on minute objects, in the pursuit of his business, aggravated likewise by the painful assistance of glasses, first obtained relief of the inflammation of his eyes by the effluvia of this substance alone; and afterwards, of the remaining affection of the eye-lids, by the application of the spirit itself. The pain and inflammation following this application were extremely severe, but soon terminated in his complete cure.

Duncan's Annals of Medicine for 1799, p. 474.

HYDROPHOBIA.

Dr. A. Fothergill has lately published an essay on "*The Nature of the Disease occasioned by the Bite of a Mad Dog,*" in which there is much good sense and consolatory information.—This is one of the most terrific and afflicting maladies to which human nature is subject: but inquiries of this nature will serve, we hope, to make it better understood, and may lead to the application of an effectual remedy. Dr. F.'s examination is truly philosophic; and the maxim which he takes for his motto, *Principiis obſta, ſero medicina paratur*, should be well considered in the prevention of the malady attendant on the bite of a mad dog. Many curious facts are contained in this paper, which our limits prevent us from noticing: but the ingenious author has clearly shown why the boasted medicines hitherto employed have proved ineffectual, and he has suggested a more probable method of prevention and cure. He considers "hydrophobia as a species of spasmodic *angina*, produced by a specific contagion, which exerts its influence first on the injured part, and afterward on the organ of deglutition." The indications of cure he states to be, 1st, to dissolve the fatal connection between the injured part and the organ of deglutition; 2dly, to calm the violent spasms,

and soothe the nervous system; and, 3dly, to support the strength and invigorate the whole frame."

Dr. F. recommends that the part bitten should be sucked; which method is as safe as it is simple. If the poison be supposed to have taken any effect, he advises (in agreement with most other medical men) that the part affected should be cut out, and the wound cauterized, to prevent the irritation being propagated to the throat; applying also a sharp blister to the throat, from ear to ear. In the second place, he would dissolve, in a pint of olive oil, half an ounce of camphor, and have the whole body diligently rubbed with it before a gentle fire: or he would plunge the patient in an entire bath of warm olive oil, if it could be procured, as a means of exciting a copious perspiration: after this, in the third place, he would give the patient the most nutritious aliment.

Monthly Review, April, 1800.



APPENDIX.

ARTICLE I.

PLANS FOR EXTINGUISHING PESTILENTIAL FLUIDS.

No. I.

Excellence of Calcareous Materials for building and paving Cities, particularly as respects their Power to overcome the exciting Cause of Fevers. In a Letter to the Hon. RICHARD VARICK, Esq. Mayor of the City of New-York.

East-Rutger's-street, June 18, 1800.

SIR,

I CRAVE the indulgence of the Chief Magistrate of the city in which I reside, while, in a few sentences, I state some facts which seem to me capable of conducing to the good of the community. They refer to the quality of the materials which ought to be selected for the construction of houses, and for pavements of streets, in cities. It will, I doubt not, become evident to you, that of all the incombustible substances of which houses and pavements have been formed, calcareous earth, in the forms of lime-stone and marble, is the best.

The wholesome operation of lime is so well established, that nobody pretends to doubt it. In buildings it answers two purposes; the first as a cement, enabling the architect to make his pieces of solid materials stick together; and the second as a neutralizer of the noxious fluids commonly produced where human beings dwell thick together. For the former of these purposes it is necessary that crude lime-stone should be calcined; for, by that operation its carbonic acid is driven off, and the remaining earth rendered fit to be slacked, and turned to plaster and mortar; but for the latter intention, this exposure to fire in a kiln is not necessary, since the acid of pestilence, by virtue of its strong and corrosive qualities, is attracted by the earthy basis, and overcome by it completely, without that process.

A marble differs from a lime-stone not in its internal characters, but only in its external qualities, particularly as they affect the sight. Strictly speaking, all marbles are lime-stones, and so, indeed, are chalks. And lime-stones are dignified with the appellation of marbles when they receive a high polish, and possess a lustre and colours agreeable to the eye. In all their forms, lime-stones and marbles consist chiefly of lime united to "carbonic acid," called also "fixed air." And these two substances commonly form rocks and stones of great compactness and durability. Lime-stone, then, though it will not answer the purposes of BEAUTY so well as marble, is quite as good for the uses of architecture and of HEALTH. When intended to constitute the chief and solid material of a building, it must be used in its *crude* state; when wanted as a cement, it must be *burned*.

Crude lime-stone and marble being thus capable of attracting and destroying infectious fluids, it became a serious matter of inquiry with me, more than a twelve-month ago, whether large tracts of country, underlaid by strata of these substances, were in any degree exempted from febrile distempers? The immunity of such regions from intermittents, remittents, dysenteries, and the more malignant forms of fever, is most remarkable in many parts of the earth.

Struck with the comfortable result of this part of the inquiry, it immediately occurred to me, that if a city was built of these materials, it ought to be very healthful, as respected the causes and existence of *fevers* at least. I had not ruminated on the subject long, before Mr. Da Costa, an intelligent Portuguese gentleman, gave me a description, in writing, of the city of LISBON, built of these very materials, and at once one of the most *nasty* and most *healthy* places in Europe.

Finding thus a great city ready built to our hands, my speculations no more appeared in the light of a project. The experiment had long been made, and their truth was manifest. I then recollect ed to have admired very much the chalky soil of Oxfordshire, in England, when I was there, surrounding, to great extent, the city and university of OXFORD. Chalk is but a softer kind of lime-stone; and this celebrated seat of learning is remarkably healthful.

Immediately it came to my remembrance, that the handsome structures with which I had been pleased so much at BATH, upon the Avon, were composed of lime-stone too. Here was another coincidence between great healthfulness and calcareous materials for buildings.

In the collection of mineralogy I had made for Columbia College, I knew there was a piece of the rock which constitutes the SOMERS ISLANDS, and of which the houses at St. George's, in BERMUDAS, are composed. By experiments made on this specimen I became convinced of its calcareous nature. And this place is proverbial for its salubrity.

Soon afterwards Major Imrie's description of the mountain of GIBRALTAR fell into my hands. That discerning officer calls this famous promontory "a mountain of marble." I procured a piece of this rock, and am satisfied, by experiment, of its calcareous composition. Gibraltar also is famed for its friendship to the health of man.

In short, having been lately on a journey to Pennsylvania, I observed that EASTON, NAZARETH, and BETHLEHEM, in the county of Northampton, were built of lime-stone. These, and particularly THE LATTER of these villages, after more than fifty years experience of the Moravian brethren, has a remarkable correspondence with the places already mentioned in point of health. Febrile distempers are very rare.

It now appears to me, the efficacy of *lime-stone, marble and chalk*, in their ordinary, natural, or crude forms, to prevent febrile diseases by absorbing and destroying their exciting causes, is thus most amply verified. What have the citizens of such places as New-York and Philadelphia to do but to introduce it into use? Fortunately for our city, the Hudson runs through a lime-stone country for miles between Poughkeepsie and Newburgh; and, even on this side of the Highlands, it is found at the base of the Donderberg, and is plentiful at Verplanck's Point. It is submitted to your consideration, whether, as it may be so easily procured by water-carriage, it would not be wisest and best to require the inhabitants, by public authority, to have their buildings made of it? And whether it would not be worth the while to introduce it, as soon as possible, for paving side-walks and streets, as well as for flagging cellars, alleys and yards?

Providence has furnished calcareous earth with a liberality equal to its extensive utility. And, under the conviction of the great benefits to be derived to society from a plentiful and proper use of it, I have ventured to suggest these few considerations to you, with the hope, that if they should seem to you worthy of that honour, they may be laid before the Common Council of the city, as matter for reflection.

With sentiments of high respect,

I remain sincerely yours,

SAMUEL L. MITCHILL.

City of New-York, fs.

AT a Common Council held on Monday, the twenty-third day of June, 1800, Mr. Mayor laid before the board a letter he had received from Samuel Latham Mitchill, Professor of Natural History, Chemistry and Agriculture in Columbia College, in which he recommends the use of lime-stone in the erection of buildings and paving streets in this city, to promote the health thereof; which was read and considered by the Board; and thereupon it was

Resolved, That the said letter be published for the information of the public; and that Mr. Mayor be requested, on behalf of this Board, to thank Dr. Mitchill for his zeal and attention evidenced in the communications contained in his said letter; and that they will be happy to receive such further communications as he shall think proper to offer on the subject of the health of this city.

Extract from the minutes,

ROBERT BENSON, *Ck.*

ARTICLE II.

No. II.

Methods of counteracting the Mischief occasionally arising from the Interment of the Dead in Cities, by BARILLA and CHALK. In a Letter from SAMUEL L. MITCHILL to JACOB DE LA MONTAGNIE, Esq. Alderman and Justice of the Police for the City of New-York; dated July 16, 1800.

DEAR SIR,

THE printed copy of your report to the Common Council, concerning an improved plan of PROVIDING FOR THE POOR, I return to you, with the few remarks which occurred to me since yesterday, written on the margin. Now we are on the subject of reforms, I shall, in reply to your letter of the 15th, communicate to you a few observations on what I believe to be a desirable method of DISPOSING OF THE DEAD.

The evils experienced from long-continued and frequent interment of human bodies within the precincts of cities, have been so well foreseen by the Common Council, that the dis-

posal of the dead is conducted already in a much better manner than it used to be.

In strictness of conduct, the bodies of those who are dead ought to be carried quite out of town, and not be suffered to putrefy near the habitations of the living. There are, however, two objections, in the present state of society and manners among us, to the execution of this in its full extent.

The first is, the diminution of the revenue of some of the religious associations among us, by prohibiting interments near the places of public worship. It is stated, that if the practice should be totally and suddenly prevented, before other sources of income are opened, considerable inconvenience would be experienced in consequence of it.

The second objection arises from the habits of thinking and acting, in regard to funereal matters, indulged by many professors of christianity, that it is better to be buried in consecrated land, or—within, or, at all events, near a house of public worship, than any where else; and also that there is a sort of society in death, influencing families to wish to lie together, and inclining the wife to be inhumed near her husband, children near their parents, and, generally, relations in the same vicinity. It is conceived, the feelings of many persons would be deeply affected by a regulation peremptorily forbidding their remains to be laid in the church-yard or family vault.

Reforms of these kinds are commonly best brought about by degrees; and, until the one contemplated in this case can be thoroughly effected, it will be our duty to prevent the mischief resulting from the corruption of those human bodies which are committed to the earth in the central parts of populous places. The horrible effects of the vapours issuing from these masses of putrefaction, in many parts of Christendom, are fully detailed in an instructive little volume, published some years ago in Paris, by Mr. VICQ. D'AZYR.

This prevention can be effected by surrounding the body with **ALKALINE SUBSTANCES**. Those which are entitled to a preference for the present purpose are **BARILLA** and **CHALK**.

Barilla, or the **SODA** of modern commerce, is the substance used anciently in Egypt to prepare human bodies for embalming. Herodotus, the Greek historian, has mentioned it as being employed for that purpose. And the elder Pliny has written of its power to preserve dead bodies. There can be no doubt, by a sound expositor of the fiftieth chapter of Gene-

sis, that the bodies, both of JACOB and his eminent son JOSEPH, were kept sweet and harmless by the barilla, which, according to the rites of the Egyptians, the physicians or embalmers applied plentifully to every part. Thus the corpse of the aged patriarch was rendered capable of being transported to the cave of Machpelah.—The ruler of Egypt, under Pharaoh, being about to die, took an oath of the by-standers, his countrymen, that they should carry up his bones from thence. His death happened in the year 1635 before the Christian Æra, and he was not, *at that time*, carried into the land of Canaan, to be deposited with his father; but, one hundred and forty-four years after, Moses, on departing with the Israelites, took the bones of Joseph with him. And this affords a tolerable proof of the antiseptic power of the barilla; for, without such a preservative, they would, probably, in a much shorter time, have crumbled to dust. It is well worth the while to examine the learned and instructive commentary of CALMET* on these subjects.

This salt is produced *naturally* in Egypt, and dug out of the earth. But it is produced *artificially* in Sicily and Spain, from the ashes of certain plants. There is great consumption of it in the manufactories of soap and glass, for which purposes it is preferable to pot-ash. Barilla, or soda, is better than pot-ash to preserve bodies from decay, and, at the same time, to render them innoxious. *Pot-ash* attracts moisture from the air, and runs to a liquid; *soda* parts with its water very readily, and turns to a powder. The *former* is highly *corrosive*; the *latter* very feebly caustic. Hence the superior excellence of soda; for while it resists the humidity of the atmosphere, it attracts the acid of putrefaction, and thus guards

* On le met (le corps) dans le sel (le nitre des anciens au la soude) pendant environ quarante jours, &c.—*they put the body in natron, or soda, for about forty days, after which they wrap it in bandages with myrrh, gum, &c.*—Ceux qui n'ont pas le moyen de faire cette dépense se contentent de seringuer dans les intestins du mort, par le fondement, une liqueur tirée du cedre, et l'y laissant, enferment les corps dans le sel du nitre. Ce sel a la vertu de dessiecher les chairs solides, et de les exempter de la pourriture, &c.—If the persons are too poor to go to any considerable expense, the embalmers cleanse the intestines by syringing, and put the body afterwards in soda, for seventy days, to dry it; and this is the substitute for the more costly mode of embalming. CALMET, *Commentaire Littéral sur la Genèse*, ch. L. p. 839.—Why have not physicians and philosophers discerned that soda, which is so wonderfully preventative of putrefaction and its consequences in the cases related, could answer just as good a purpose in preventing the bad effects of corrupted beef, mutton, pork and fish, in barrels, in the holds of ships, and in the stomach and intestines of men?

the body from speedy decay, while it keeps it from degenerating to stench and poison. At the same time it discharges its carbonic acid or fixed air.

On account of the plenty of pot-ash and pearl-ash in the American market, barilla is rarely brought to New-York. It, at present, has no place in the price-current. In London, barilla from Carthagena sells for about one-fifth less than pearl-ash from America; and that from Sicily for about one-third less. There would be no difficulty in procuring it if wanted. It might be imported as ballast, or even manufactured at home. The method of using it would simply be to surround the dead body with this neat and white salt, by filling up the coffin with it.

Or, if soda could not be procured, or if prejudices were entertained against it, POWDERED CHALK would fully answer the purpose. Chalk is a sort of lime-stone; for, in many places where it naturally abounds, it is burned to a calx, and used for mortar.—A notion has prevailed, that quick-lime is necessary to overcome the dangerous effluvia of bodies. This is not the fact. Quick-lime, indeed, by its corroding quality, will disorganize, to a certain extent, the body to which it is applied. For this reason, I suppose it is, that it has not been more generally used; as most persons have felt a degree of reluctance to subject the bodies of their lately deceased friends and relatives *immediately* to the action of that fierce and violent destroyer. There is no need of applying lime in its *quick* or *caustic* state. Mild powdered lime-stone will do just as well. PULVERIZED CHALK is powdered lime-stone, and in a condition exactly fit for the purpose. And if it is wanted in a still nicer form, whiting, well dried in an oven, will be found to possess the requisite anti-pestilential qualities. To surround a dead body, then, with powdered chalk or whiting, is a safe, economical, and, as far I can judge, an unexceptionable practice. And if there is any thing consoling in the reflection, the survivors may be assured that CHALK, as well as SODA, while it provides against their noxious effects, will operate in preserving the mortal remains of their friends the longer from complete disorganization. And I refer those who desire proofs of this, to the innumerable relicks of animals, in beds of chalk and other forms of calcareous earth, all over the world.

With sentiments of friendship and much regard,
I remain cordially yours,

SAMUEL L. MITCHILL.

ARTICLE III.

Extracts from an Address delivered before the Medical Society of South-Carolina, on the 24th December, 1799.

By DAVID RAMSAY, M. D.

GENTLEMEN,

IN reviewing the medical history of the year now drawing to a close, we observe an unusual phenomenon. On the 11th of April, about three o'clock A. M. a shock of an earthquake was observed throughout Charleston. Several of the inhabitants were alarmed by the rattling of windows and furniture, and were sensible of a tremulous motion in every part of their houses. It continued from six to ten seconds. It was also felt in Beaufort, Christ-Church Parish, Georgetown, Statesburgh, and Camden, at or about the same time. It was more violent in the two last places, and was said to have lasted more than a minute.

Some of our old citizens recollect, that on the 19th of May, 1754, a similar convulsion of the earth was observed in Charleston. With the exception of these two instances, neither history nor tradition inform us of any event of this kind, either before or since the Europeans settled in this place.

The late earthquake probably originated far to the westward, and was only communicated to the sea-coast by convolution. Such events are more natural to hilly, mountainous regions, abounding with minerals, and are not much to be dreaded in our low, humid soil. The last summer has been moderate. There were no more than three days in the whole of it, in which the mercury rose above 88. The 19th of July was the hottest day, when the mercury rose to 91. It reached to 89 only on two other days, viz. June 14th and July 15th. The coldest day in the present year was January 7th, when the mercury fell to 23; but in those months which followed the summer, it has not been lower than 30, which was its station on the 30th of November.

The earliest frost in Charleston was on the 13th of November. In the year 1798 there were not more than four months between the latest and earliest frosts; but in the present there have been more than six. Dr. Rittenhouse has observed frost in Pennsylvania every month of the year, except

July. The circumstance of our long exemption from this enemy of vegetation, gives us great advantages in the cultivation of such articles as are of slow growth, and incapable of bearing cold. This is remarkably the case in our new staple, cotton.

There have fallen, in the course of this year, rather more than 75 inches of rain. The last months of it have been uncommonly wet. In one day (the 25th of September) there fell upwards of eight inches of rain. In the months of August, September and October, there fell upwards of 35 inches. This is but little short of what was observed by Bruce, in the countries near the source of the Nile, which furnish the means of the annual inundation of that celebrated river. The long continuance of this damp weather has produced an uncommon number of rheumatic cases, and has materially injured the cotton crops. The small-pox was, early in the year, introduced in the natural way, and spread very generally by inoculation. It was remarkably mild. This disease has been, for some years past, much less formidable than it was thirty or forty years ago. It is a matter of consolation, that while we are invaded by new diseases, some of the old ones have moderated.

Till the month of August, the year has been healthy to all descriptions of people. The old permanent inhabitants have not suffered more, perhaps I might say not so much, even in the most sickly season, as had been usual.

One solitary case occurred, in the month of May, of a person, thirty days from the Havannah, who died in this port of the yellow fever. In the month of June, some sailors from a Spanish vessel, and in the month of July, some other sea-faring persons, were seized with the same disorder: about the middle of August it became epidemic, and continued till about the middle of October. Six or seven persons fell victims to it in the month of October and the first half of November; since which it has disappeared. The mortality from this disease, though considerable, was much short of what common fame stated it to be. From the accurate inquiry made by your committee, it appears that the number of white persons interred in the different burial grounds of this city, between the first of August and the first of December, was 362, and of that number 239 were strangers. From the report of Mr. Brown, city-marshall, made to the intendant, it appears that the whole number of persons (inclusive of both white and black) interred in the different burial grounds

of this city, in the months of July, August, September and October, was 544, and of these 123 were negroes. If we add twelve for the probable amount of the number of persons who died in the city, and were carried into the country for interment, we have the extent of the mortality in Charleston in the four most sickly months of the year 1799, which comprehended the period in which the yellow fever was epidemic, and some time before and after.

Persons coming from the higher northern latitudes of Europe and America, were most subject to this disease, and most rarely survived it. The inhabitants of the country parts of South-Carolina had little better chance of escaping it altogether, or of recovering when attacked. Some instances occurred of persons being seized with it, who had resided one or two years in Charleston; but of these several recovered. In general, the danger seemed to diminish with the length of time they had resided, and their greater assimilation to the constitution of the inhabitants. Five or six children, from two to seven years of age, who had been born and usually resided in Charleston, were carried off with this disease. There were few, or rather no instances clearly marked, of its attacking and proving fatal to adults who had been long used to the air of the city, though some of its symptoms usually attended common fevers.

We have no reason to believe that the yellow fever was either imported among us, or communicated by contagion. It raged most in the north end of King-street, where the greatest number of persons from the country resided, and in those streets where sea-faring persons usually fixed themselves.

No physician nor nurse took the disease. Strangers who left the city, and afterwards sickened and died in the country, were not the occasion of death, or even of disease, to those who attended them in their last illness.

Our knowledge of this fever is very limited. It appears that there is a certain something in the air of Charleston, that is comparatively harmless to the inhabitant, but the source of disease and death to the stranger. What is that something? Whosoever shall satisfactorily answer this question, "*erit mihi magnus Apollo.*" Whatever it is, it is not necessarily destroyed by rain, for the disease prevailed most in August and September, which were the wettest months in the whole year. In the former it rained seventeen days, in the latter ten; in the two together there fell upwards of twenty-five inches of rain.

The yellow fever is eminently the disease of cities. Is it

not, therefore, reasonable to infer, that the more we assimilate our city to the country, the greater will be the probability of escaping it, or diminishing its violence? Would it not be wise in us, in addition to an unremitting attention to cleanliness, to plant such trees as maintain their verdure throughout the sickly season, in our streets, church-yards, and other open places? to cover our gardens, yards, and every vacant spot, with vegetables of large size and quick growth?

I need not mention before this learned society, that we would thereby create an antidote to that deleterious quality of the air which is generated by passing through the lungs of animals, and from the accumulation of filth. In cities, where multitudes are crowded together, the dissolution and putrefaction of every animal that dies, and the breath of every animal that lives, tend to contaminate the air; but the growing vegetables inhale, and are nourished by this poison; and, in lieu thereof, emit and impregnate the atmosphere with what is pure and wholesome. By habit we may accustom ourselves to take poison in small doses, without any deleterious effects. From the same principle, the inhabitants of a city may, without particular injury, inhale a tainted atmosphere, that would, in certain seasons, be fatal to a stranger used to the purer air of the sea or country, especially of a colder latitude.

To this society the police look up for advice respecting the means of preventing diseases. Let us, therefore, co-operate with the city-council, in keeping the city as clean as possible. Much has been done, but more remains to do. Our streets and our drains should be constructed on new principles, and the low grounds filled up with dry and wholesome materials. I need not recapitulate our former recommendations to the intendant and the governor; but I beg leave to point out a few instances, in which they have not been carried into execution. It is several years since we advised, that cellars in which rain water usually settled, should be filled up, so as to secure their constant dryness. This has not been done; and the inhabitants, during the late sickly season, have suffered in consequence thereof. It is true, orders were issued to empty the cellars, after they were filled with water. That is, when the nuisance became intolerable to the inhabitant, he was directed to disperse it among his neighbours.

This society also recommended, that health committees should be appointed to visit, weekly, every family, to inculcate cleanliness, and to report the names of defaulters. This duty has been so carelessly performed as not to answer the end. The

time is past, when men used to work for the public without fee or reward. This business, though of the first consequence to the health of the city, will never be performed as it ought to be, till one or more responsible officers are appointed, with suitable salaries, and adequate powers, to compel housekeepers, in a summary way, to keep their cellars, their stables, their privies, and their yards, wholesome and clean.

This society also recommended, that in future streets should be laid out 100 feet wide. The first settlers, in planning Charleston, had no idea of its future growth. Little did they think that in one century it would be the metropolis of an independent state, extending from the Atlantic 300 miles to the westward. Little did they think, that before the end of the year 1800, such would be the increase of population and wealth in South-Carolina, that one hundred and seven of its citizens would complete a canal that opened a water communication between Charleston and the Allegheny mountains, at an expence five times greater than the sum the whole province sold for about 80 years before. The original plan of Charleston was, therefore, more suited for a country village, than for the capital of such a State as South-Carolina soon will be, or even now is. It was wise in this society, to recommend a more enlarged plan in the extension of the city into the country.

I had anticipated, in imagination, that, at no very distant day, a new Charleston would have been erected to the westward of Boundary-street, in which we, or, at farthest, our children, enjoying a free, pure, and wholesome air, would forget the narrow streets, the confined lanes, and the dirty alleys of the present city. Sorry I am to add, that in the course of the last week, there have been advertised lands for lease, on a plan that contemplates the laying off 137 acres, very little more than a mile from the State-House, in small lots, and with narrow streets. I call upon you, gentlemen, in your intercourse with the citizens, to discourage the present rage for making the most of land, by subdividing lots and crowding houses so close together, as to prevent a free ventilation. To the narrow confined streets of the present city, we must submit: but let all plans for its enlargement be most pointedly discouraged, that are not suited to our extended prospects, and calculated for the health and comfort of our growing numbers. The citizens should be warned, that by a contrary policy, they are sowing the seeds of a yearly visitation from the yellow and other fevers. Let us carefully avoid entailing these evils on posterity.

The events of the last summer should rouse all our activity. That fever which before was confined to strangers, has, within the last three months, attacked a few of our children. One grade more of malignity in the exciting cause, and the distinction in favour of inhabitants which has heretofore prevailed, will probably be done away. Let the months that precede the next summer, be faithfully employed in opening and cleaning the present drains, and increasing their number—in removing every accumulation of filth. I wish not to alarm, but to excite industry, while I declare it to be my opinion, that unless an active, energetic police pervades every part of our city, the inhabitants as well as strangers have reason to fear the summer and autumn of the year 1800.

DAVID RAMSAY.

Charleston, Dec. 24, 1799.

CORRESPONDENCE.

To the Editors of the Medical Repository.

I THINK myself obliged to the writer of your review of books for his candour and impartiality with respect to my late tract on phlogiston; but I hope I may be allowed to observe, that he has misstated my opinion, when he says (p. 385) that I make inflammable air, phlogisticated air, and fixed air, to be only different modifications of phlogiston: whereas, I uniformly suppose that phlogiston is only a constituent part of them all, as he himself acknowledges (p. 383). And where is the difficulty of conceiving that the same principle may be an ingredient in these different substances?

At the same time I have no objection to saying, with this writer, that phlogiston may be defined to be *the base of inflammable air*, provided that the same thing be allowed to be a necessary part of all the metals, and also of sulphur, phosphorus, &c. That phlogiston cannot be exhibited alone is nothing extraordinary. Indeed, few things in nature can be so exhibited. Certainly not the principle of *acidity* or *alkalinity*. These are always found combined with some other substance. But do we, therefore, say that such principles do not exist, or that their existence cannot be demonstrated?

I am, with much respect, Gentlemen,

Yours sincerely,

Northumberland, July 6, 1800.

J. PRIESTLEY.

ON THE DECORTICATION OF APPLE-TREES.

To the Editors of the Medical Repository.

THE manner in which you have related the experiments upon apple-trees (Med. Rep. vol. iii. p. 420), has induced a conjecture that you consider it as a novel discovery, that removing the bark from their trunks does not destroy their existence. The following article, copied from the *Miscellanea Berolinensia*, will, therefore, probably be new to you: and as it contains some useful observations upon the subject, it is presumed it will not be altogether unacceptable. Yours, &c.

July 12, 1800.

CANTABRIGIENSIS.

De Cortice Arborum circum circa sine Damno de toto stipite detracit et renascente. J. L. FRISCH.

VIR generosiss. de Huneken, Dominus de Carpzow Decus Nobilium Martia, et fautor omnis generis utilium studiorum, monstravit mihi modum renovandi corticem arborum fructiferarum, quarum magnam copiam Carpzovii in egregio pomerario prope sedem suam habet. Siquidam pomorum aut pirorum videt cortice asperiore, aut cerasum resinam exudantem et tuberibus deformem, vel alia quacunque ratione suspectam, qua fœcunditas arboris propter corticis defectus impeditur, aut sequentibus annis impediri, vel stipitis pulchritudo maculari possit, non vulgari modo de sanitate harum sollicitus est; non abradit asperiora; non partem aliquam exterioris corticis solvit et aufert; non rescindit nodulos et emplastris vulnus curat; non venas fecat; sed, quod mireris, totius stipitis corticem a primo sive inferiori ramo, vel a corona primorum ramorum, quam inferiores scienter cultarum arborum rami formant, usque ad terram detrahit. Et quidem non tantum exteriorum et duriorem, sed et interiorem et subtiliorem librum, ita ut album lignum, ablatis etiam tenuissimis et viridioribus fibris, ubique æque appareat. Cum hanc methodum curandi arbores primum audirem et magnæ auctoritatis vir mihi affirmaret eam innocentem esse, non potui dubia mea occultare, quia contra communem experientiam est. Moriuntur enim arbores in quibus vel in linea fit, quod hic toti stipiti fieri posse dicebant. Sed postquam singulari Dom. de Huneken favore occasio mihi data fuit videndi complures arbores hac ratione recenter nudatas, et alias novo cortice tectas, experientia nunc edocitus fateor me id vidisse, quod nunquam vidi, et quod forsan nemo apud nos scivit, aut, si scivit non ausus est tam egregias et fœcunditate sua utilissimas arbores omni cortice in stipite privare. Ad incrementum igitur studii physici, et imprimis Δειδολογίας, historiæ naturalis egregiæ partis, pauca illa, quæ de hac methodo annotavi, bona cum venia generosiss. Dom. de Huneken, experimenti hujus apud nos Auctoris Lectori B. communicare volui.

1. *Tempus solstitii aestivi observetur.*

Quo tempore succus arboris liquidior & copiosior fluit; habita simul ratione situs horti vel loci arborum, quia in versus meridiem sitis citius fluero incipit succus alibi tardius.

2. *Cortex omnis in stipite detrabatur.*

Inæqualitas enim manentis & renascentis partis arborem valde deformem redderet.

3. *Succus exsudans penna anserina aequetur, ubicunque stagnat, & ad spatia nondum tecta trabatur.*

4. *Ne solis effusus bac succi effluvia impediatur, umbra stipiti nudato fiat.*

Potissimum in parte meridionali, expansis linteis vel connexis et erectis arundinibus vel quocunque alio modo pro loci commoditate. Eodem modo etiam ventorum impetus arceatur, ne pulvere vel arena noceant.

5. *Absint denique omnia quæ tactu quocunque novum et adhuc mollem corticem maculare possint, cuius teneritas tanta est, ut vel minima frictione lœdatur.*

Artibus, quæ arborum corticibus utuntur, et possessoribus talium arborum hoc experimentum imprimis utile esse potest.

Miscellanea Berolinensia, tom. 3. p. 26, 27, 28. Edit. Berolin. 4to. 1727.